A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT

A DISSERTATION SUBMITTED TO THE TAMILNADU
Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI,
IN PARTIAL FULFILLMENT FOR THE DEGREE OF

MASTER OF SCIENCE IN NURSING

CHILD HEALTH NURSING

BY

301617552

SRESAKTHIMAYEIL INSTITUTE OF NURSING AND RESEARCH
(JKK NATTRAJA EDUCATIONAL INSTITUTIONS)
KUMARAPALAYAM (PO),
NAMAKKAL DISTRICT – 638 183.

OCTOBER – 2018

A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT

BY

301617552

Research Advisor: **....……**

Dr. Mrs. R. JAMUNARANI, M.Sc (N)., Ph.D.,
Principal,
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam, Namakkal District.

Clinical Specialty Advisor: ……

Mrs. P. BEULAH, M.Sc., (N)., PGDSH,
Professor cum HOD, Child Health Nursing,
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam, Namakkal District.

A dissertation submitted in partial fulfillment of the requirement for the Degree of Master of Science in Nursing to The Tamilnadu Dr. M.G.R Medical University, Chennai.

OCTOBER – 2018

CERTIFIED THAT THIS IS THE BONAFIDE WORK OF

301617552

AT SRESAKTHIMAYEIL INSTITUTE OF NURSING AND RESEARCH

(JKK NATTRAJA EDUCATIONAL INSTITUTIONS)

KUMARAPALAYAM (PO),

NAMAKKAL DISTRICT – 638 183.

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING TO THE TAMILNADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI.

EXAMINERS:

1. ……..

2. …….

DECLARATION

I, 301617552, hereby declare that this dissertation entitled "**A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"** has been prepared by me under the guidance and direct supervision of **Dr. Mrs. R. JAMUNARANI, M.Sc., (N), Ph.D., Professor cum Principal, and Mrs. P. BEULAH, M.Sc., (N)., PGDSH, Professor cum HOD, Department of Child Health Nursing,** Sresakthimayeil Institute of Nursing and Research, (J.K.K. Nattraja Educational Institution), KUMARAPALAYAM, Namakkal District as the requirement for partial fulfillment of **MASTER OF SCIENCE IN NURSING** degree under **THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI – 32.** This dissertation has not been previously formed and this will not be used in further for award of any other degree/ diploma. This dissertation represents independent work on the part of the candidate.

Place : Kumarapalayam

Date : October 2018

301617552

II year M.Sc. Nursing Student

SRESAKTHIMAYEIL INSTITUTE OF NURSING AND RESEARCH
(J.K.K. Nattraja Educational Institution)
KUMARAPALAYAM,
NAMAKKAL DIST.- 638183

ACKNOWLEDGEMENT

The mathematical sciences particularly exhibit order, symmetry,

and limitation and these are the greatest forms of the beautiful.

- Aristotle

First, I thank **God Almighty** for His grace and blessings to successfully complete this study.

I express my thanks to **Tmt.N.SENDAMARAI,** Chairperson, and Our Managing Director **Mr. OMM SARAVANA,** for their support during this study.

I would like to pay special thanks, warmth and gratitude to **Dr.Mrs.R.JAMUNARANI, M.Sc., (N), Ph.D.,** Principal for her worthwhile guidance and encouragement which pushed me to achieve my goal.

My heartfelt and sincere thanks to **Mrs. P. BEULAH, M.Sc., (N)., PGDSH, Professor cum HOD, Department of Child Health Nursing,** for her efficient guidance, untiring and patient correction, encouragement and valuable suggestions which helped me to lay strong foundation of this study.

I acknowledge with thanks **Prof. DHANAPAL, M.Sc., Senior Statistician** for his advice in statistical analysis.

I convey my special thanks to the study participants for their co-operation and help during the study period.

I would not forget to remember thanks to **ALL TEACHING STAFF AND NON TEACHING STAFF** of Sresakthimayeil Institute of Nursing and Research, Kumarapalayam for their constant encouragement throughout the study.

I wish to express grateful thanks to **Mrs.S.JAYAMANILAKSHMI, MA., B.Ed.,** Head Master, Panchayat Union Primary School, Uvari, Madurai for allowing me to conduct my study and validating the tool and whole hearted support and encouragement.

I wish to express grateful thanks to **Dr.G.MAHESWARI, M.Sc., (N), Ph.D., Professor cum HOD, Department of Paediatrics, Mr.Y.SHAJIN GIJO, M.Sc., (N) Psychiatric,** Associate Professor, Dhanvantri College of Nursing, Pallakkapalayam for validating the tool and support during my study.

I wish to express grateful thanks to **Mrs.S.INDIRA, M.Sc., (N),** Vice Principal, Anbu College of Nursing, Kumarapalayam for validating the tool and support during my study.

I wish to express grateful thanks to **Dr.S.ANANADHA KRISHNAKUMAR, M.D., D.P.M.,** Assistant Professor in Psychiatry, Govt. Rajaji Hospital, Madurai, for validating the tool and support during my study.

I wish to express grateful thanks to **Dr.MAHENDRAN RAMASAMY, M.D., (Physician), M.D. (Ped),** Ramasaamy Hospital, Perumbalur for validating the tool and support during my study.

I am greatly indebted to my Beloved Husband **Mr.T.MUTHUKUMAR, M.Sc., (N),** my beloved daughter **Baby M.AKSHITHA,** for their never ending love, faith, support and encouragement throughout the study.

I also take this opportunity to extend my thanks to my beloved parents **Mr.S.NATHAN** and **Mrs.SELVAKUMARI** and my brothers **Mr.V.SANKAR, Mr.MUTHUKUMAR, Mr.SATHISHKUMAR, Mr.SELVAKUMAR** and my friends **Mr.SUNDHAR, Ms.SUDHARSHINI** for their great support and helped me in successfully completing my thesis.

I extended my thanks to my mentor **Mrs.SUDHADEVI, M.Sc., (N),** for her moral support to complete the study.

I am extend my sincere thanks to my companion **Mrs.S.SUBHASHINI, Mrs.THANGAM, Ms.K.DIVYA,** for their support and helped me in successfully completing my thesis.

I extend my thanks to **library staff and office staff**, Sresakthimayeil Institute of Nursing and Research, for their help during the course of study.

My gratefulness extended to all those who have directly and indirectly helped me in the completion of this work.

I also wish to thank **Mr.V.Mohanraj, Space Digital Works, Vattamalai** for his support and helping me to complete data as a printing format.

"Above all, the investigators owe this success to Almighty"

301617552

ABSTRACT

Background: Learning disability (LD) is a general term that describes specific kinds of learning problems. A learning disability can cause a person to have trouble learning and using certain skills. The skills most often affected are reading, writing, listening, speaking, reasoning, and doing mathematics. **Statement of the problem:** A study to compare the effectiveness of peer assisted learning strategies vs numeracy intervention programme on dyscalculia among schooler in selected school, Madurai district. **Objectives:** (1) To assess the level of dyscalculia among schooler before and after peer assisted learning strategies and numeracy intervention programme in experimental group I and experimental group II. (2) To assess the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II. (3) To assess the difference in the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II. (4) To find out the association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II. **Research design:** Factorial Research Design. **Setting:** The present study was conducted in selected School at Madurai District. **Participants:** The total sample size selected for this was 60 students out of which 30 students from experimental group I and 30 students from experimental group II. **Method:** Pretest was conducted on schooler in the schools by using Questionnaires for Dyscalculia to assess the level of dyscalculia. The class teachers gave the list of students who were studying in 2nd and 3rd standard. Implemented the peer assisted learning strategies and

numeracy intervention programme for randomly selected 2nd and 3rd students with the duration of 30 minutes for 4 weeks. Post test was conducted for the subjects to assess the evaluation of numeracy intervention programme by using the Questionnaires for Dyscalculia which was assessed by the researcher. **Result:** Chi-square was calculated to analyze the association between post test scores of dyscalculia among experimental group I and experimental group II of schooler with their demographic variables. The results shows that, there were no significant association between the post test scores of dyscaulia in experimental I and II and their selected demographic variables. **Conclusion:** From the findings of the study it can be concluded that, Highest percentages with schooler were in the age group of 6-7yrs, most of them were males, second child with good extracurricular activities and regular attendance in the class for the groups. Peer Assisted Learning strategies and Numeracy intervention programme were highly effective on dyscalculia. There were no significant difference in effectiveness of Peer Assisted Learning a strategies and Numeracy intervention programme on dyscalculia. There is no significant association found between the post test scores of Experimental group I and II when compared to age, sex, birth order, extracurricular activities and attendance, ($p>0.05$).

LIST OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER – I

INTRODUCTION

"A baby is like a seed, shower it with love and care and it will bloom into something beautiful that is beyond your imagination"

- Rabindranath Tagore

Raising school-age children can be awesome. They are always doing new activities, cheering them on at athletic events and applauding their accomplishments at recitals are usually some of the high points for most parents. However, achieving success is often preceded by frustration and sometimes learning to accept one's weaknesses as well as celebrating and building on strengths. When will equipped parents can be excellent coaches for their child no matter what the endeavor **(US Child Development Institute, 2018).**

The school age refers to children between the age of 6 and 12 years, experience a time of slow progressive physical growth, while their social and cognitive developmental growth accelerate and increase in complexity. The focus of their world expands from family to teachers, peers and other outside influences (coaches, media).The child at this stage becomes increasingly more independent while participating in activities outside the home. **(Terri Kyle, 2017).**

Learning disabilities are often grouped by school-area skill set. If your child is in school, the types of learning disorders that are most conspicuous usually revolve around reading, writing, or mathematics .i.e., Learning disabilities in reading (dyslexia), in mathematics (dyscalculia), in writing (dysgraphia), in motor skills

(dyspraxia), in language (aphasia/dysphasia), Auditory and visual processing problems **(Help Guide Organization, 2015).**

1 billion people have a disability with at least 1 in 10 being children and 80% living in developing countries. In accordance with the social model outlined in the Convention on the Rights of Persons with Disabilities **(CRPD),** children with disabilities have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others **(World Report On Disability, 2015).**

School age children are the brightest treasures and bring fourth into this world, but too large a percentage of the population continues to treat them as inconveniences and nuisances, when they're not treating them as possessions or toys. In Tamil Nadu, the total number of child population is 10,504,916. In that 5,580,212 children are boys and 4,924,704 children are girls. **(National Cenus, 2014)**.

"Learning Disabilities" is an "umbrella" term describing a number of other, more specific learning disabilities, such as dyslexia ,a language and reading disability dysgraphia, A writing disorder resulting in illegibility, dyspraxia means problem with motor coordination ,dyscalculia which means Problems with arithmetic and mathematics concepts**.(Child Learning Disability Centre, 2014)**

Learning disability (LD) is a general term that describes specific kinds of learning problems. A learning disability can cause a person to have trouble learning and using certain skills. The skills most often affected are reading, writing, listening,

speaking, reasoning, and doing math. Learning disabilities vary from person to person. One person with Learning disabilities may not have the same kind of learning problems as another person with Learning disabilities. One person may have trouble with reading and writing. Another person with Learning disabilities may have problems understanding math. Still another person may have trouble in each of these areas, as well as with understanding what people are saying **(National Dissemination Centre for Children and Youth with Disabilities, 2014).**

Learning disabilities (LD) vary from person to person. One person with learning disabilities may not have the same kind of learning problems as another person with learning disabilities. One person may have trouble with reading and writing. Another person with learning disabilities may have problems with understanding math. Still another person may have trouble in each of these areas, as well as with understanding what people are saying**. (The Individuals with Disabilities Education Act (IDEA), 2013).**

Currently, almost 2.9 million school-aged children in the United States are classified as having specific learning disabilities and receive some kind of special education support. In fact, over half of all children who receive special education have a learning disability **(28th Annual Report to Congress, 2013).**

Developmental Dyscalculia is a learning disorder affecting the ability to acquire school-level arithmetic skills, affecting approximately 3-6% of individuals. Progress in understanding the root causes of Developmental Dyscalculia and how best to treat it have been impeded by lack of widespread research and variation in characterizations of the disorder across studies. However, recent years have

witnessed significant growth in the field, and a growing body of behavioral and neuroimaging evidence now points to an underlying deficit in the representation and processing of numerical magnitude information as a potential core deficit in Developmental Dyscalculia. An additional product of the recent progress in understanding Developmental Dyscalculia is the resurgence of a distinction between 'primary' and 'secondary' developmental dyscalculia. The first appears related to impaired development of brain mechanisms for processing numerical magnitude information, while the latter refers to mathematical deficits stemming from external factors such as poor teaching, low socio-economic status, and behavioral attention problems or domain-general cognitive deficits. Increased awareness of this distinction going forward, in combination with longitudinal empirical research, offers great potential for deepening our understanding of the disorder and developing effective educational interventions **(Gavin, 2013).**

Dyslexia is a lifelong challenge. This language-based processing disorder can hinder reading, writing, spelling and sometimes even speaking. Dyslexia is not a sign of poor intelligence or laziness or the result of impaired hearing or vision. Children and adults with dyslexia have a neurological disorder that causes their brains to process and interpret information differently **(National Centre for Learning Difficulty, 2013)**

Dyscalculia is a condition that affects the ability to acquire arithmetical skills. Dyscalculia learners may have difficulty understanding simple number concepts, lack an intuitive grasp of numbers and have problems learning number facts and procedures. Even if they produce a correct answer or use a correct method they may do so mechanically and without confidence **(Dept for Education And Skills 2012)**

Children with dyscalculia are difficulty in executing calculation procedures, with immature problem solving strategies, long solution times and high error rates **(Geary, 2012).**

Peer Assisted Learning strategies does have a "primarily academic focus" (Black and MacKenzie, 2008) with many curriculum benefits as outlined above, of equal significance it is argued are the "intangible" benefits, which the spaces or "niches" (Havnes, 2008) which the PAL collaborative learning communities create, "such as increased cohesion of the student group, reassurance about study concerns and increased confidence." (Bournemouth University website). As has already been mentioned, evidence also reports wide ranging benefits to PAL Leaders, including cognitive, personal and instrumental progression **(Micari, Streitwieser and Light, 2012).**

Students who are actively involved in learning, that is who spend more time on task especially with others, are more likely to learn, and in turn, more likely to stay **(Tinto, 2012).**

A foundational capacity for numbers is revealed in human infants' ability to discriminate on the basis of the numerosity of a display and to match numerosities across modalities, which suggests that the capacity is not tied to one modality and implies a relatively abstract understanding of numerosity. To be foundational, representations of numbers must be able to enter into arithmetical operations. Formally, arithmetic is interpretable in terms of manipulations on sets, and much of early learning is based on physically manipulating sets of objects. A main prediction arising from bootstrapping is that dyscalculics will suffer from a deficit in the

subitizing range. Although there is some evidence that the small number system is impaired in dyscalculic learners, typically, enumerating the entire range from one to nine is also impaired. The numerosity coding hypothesis further predicts that impaired numerosity representations will affect addition **(BrianButterworth, 2012).**

Numeracy is the ability to use mathematical concepts and skills efficiently to meet the general demands of day-to-day life and to make sense of the world. This refers to the capacity to use a combination of numerical, spatial, graphical, statistical and algebraic mathematical thinking and strategies**. (Merlin Edward, 2011)**

Increased student retention has also then been demonstrated to have economic benefits to the institution. From a curriculum point of view, Capstick has also undertaken a comprehensive study of qualitative data to conclude positive results for students who have attended PAL in relation to 'meaning-oriented outcomes' (as opposed to solely strategic-orientated/ assessment driven outcomes), understanding course material and enhancing the ability to do well in assessed work **(Capstick, 2011).**

NEED FOR THE STUDY

On Early Childhood Development, up to 10 percent of students are classified as having a mathematical learning disability. The inability to perform mathematics questions can lead to many negative effects throughout life **(Encyclopedia, 2017).**

Dyscalculia, or mathematical learning disabilities, is a specific learning disability which affects around 6% of the population. Individuals with dyscalculia are not unintelligent, but struggle to learn mathematics, despite having an adequate

learning environment at home and at school. Dyscalculia is assumed to be due to a difference in brain function**. (Dr. Anna Wilson, 2017).**

Demographic information gleaned from the epidemiological studies indicates firstly that there are more boys than girls with this disorder; the male to female relative risk ratio ranges from 1.6 to 2.2. Other studies have shown equivalent numbers of boys and girls, but the high number of girls in these studies may reflect social (e.g., do girls really need to learn arithmetic?) or other influences on acquisition of arithmetic skills. In addition, a large percentage of children with DD also have a coexisting reading disability, the percentages ranging from 17% to 56.7% to 64%. More children with DD than expected will fall into the clinical range of behaviour disorders as measured by the Child Behaviour Checklist **(Auerbach , Gross-Tsur, Manor, & Shalev, 2016)**

According to the 2014 Trends in International Mathematics and Science Study Dyscalculia makes it difficult for the person to understand cardinal numbers, mathematics symbols and basic arithmetic. The disability is drawing greater attention, given United States' international ranking of 11th in math-achievement for fourth graders and ninth for eighth graders.

Prevalence studies have been carried out in various parts of the world, all with different definitions for developmental dyscalculia. Despite the definitional inconsistency, the prevalence of developmental dyscalculia across countries is fairly uniform, at about **3-**6% of the school population**. (Jason G Goldman, 2016)**

The prevalence of dyscalculia is estimated to be between 5 % and 15 % of the population, depending on the criteria used to define dyscalculia. Some 5 % show

dyscalculia in its more severe forms. If we take the average of 10 %, this means that 700 million people worldwide display traits of dyscalculia. These people risk life-long illiteracy and social exclusion if their dyscalculia is not addressed **(Dyscalculia International Organization, 2015).**

A study by Nathalie Badian in 1984 suggested that in the Western world, dyscalculia was thought to be four times more common in males than females and affected 4% of the population severely, regardless of socio-economic status, race or level of intelligence. However, a more recent study suggests that the gender ratio is more equal. **(Zabell C and Everett J, 2015).**

Scientists think that maths ability resides in your parietal lobes towards the back of your brain, near your ears. It seems that these systems are abnormal in dyscalculics**. (Brian butterworth, 2014)**

People who struggle to use numbers may feel embarrassed by their difficulties, and this can affect their confidence and self-esteem. They may be unable to help their children with their maths homework and be reluctant to apply for a more demanding job. They may fail to manage their money well or to get the best deals when shopping. Numeracy appears to play a more crucial role than literacy in influencing when a child in school. Those with poor numeracy but reasonable literacy are just as likely to leave school at 16 as those with both poor numeracy and literacy skills, implying that numeracy is the more significant factor**. (National Numeracy, 2014).**

Since its adoption in the British Higher Education system in the early 1990s, Peer Assisted Learning strategies **(PALS)** has developed and been implemented in

many UK institutions1, evolving into a considered and evaluated method of "student-to-student support". The benefits of the approach to both institution and students involved are widely reported through quantitative and qualitative research, and this literature review aims to summaries these findings, outlining the various approaches to PAL currently being used and the educational theory and ideas which support it. In addition to institutionally-based PAL projects, new developments in virtual PAL will also be explored to give an appreciation of its transitional and evolving nature. Inherent in much of the literature available is an acknowledgement of the multiplicity of terms used to describe PAL. Whilst recognising these variations, to aid clarity and continuity, this review will use the term 'PAL' to refer to approaches where the underlying ethos and philosophy are consistent with those of PAL as "active discussion and cooperative learning within the framework of a partnership with the formal structures of the course **(Capstick, 2014)**

As facilitators of learning, they must think through and mentally organize information before explaining it to students. This process forces peer leaders to engage with the material at a deep level, helping to solidify their own understanding of it. **(Micari, Streitweiser and Light, 2014)**

Numeracy intervention is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of

the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject**. (Numeracy Department, 2014).**

The principal focus of mathematics teaching in is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources for example, concrete objects and measuring tools. At this stage, pupils should develop their ability to recognize, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. **(Department of education of mathematical study, 2013).**

Mathematical exercise is a fun, vibrant mathematics where students enjoy learning and working to master skills. The flexibility of numeracy intervention programme provides many different ways to integrate mathematical exercise into your students' mathematics development whether it is challenging students through Independent practice as an instructional tool in class. At the same time, parents and teachers are able to stay actively involved through informative, detailed reports that point out successes and trouble spots. **(Teacher's Users Guide, 2013)**

The lacks of evidences for these two new and cost effective techniques for dyscalculia must be evaluated in order to generalize the strong supporting evidences for bring them to practice. The researcher had a plan to investigate the teaching strategies for child with dyscalculia.

STATEMENT OF THE PROBLEM

A study to compare the effectiveness of Peer Assisted Learning strategies Vs Numeracy Intervention Programme on Dyscalculia among schooler in selected school at Madurai District".

OBJECTIVES

1. To assess the level of dyscalculia among schooler before and after peer assisted learning strategies and numeracy intervention programme in experimental group I and experimental group II

2. To assess the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II

3. To assess the difference in the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II

4. To find out the association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II.

HYPOTHESIS

H_1 : There is a significant level of dyscalculia among schooler before and after peer assisted learning strategies and numeracy intervention programme in experimental group I and experimental group II

H_2 : There is significant effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

H_3 : There is significant difference in the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

H_4 : There is a significant association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II.

OPERATIONAL DEFINITION

Peer Assisted Learning Strategies

This is teaching programme by peers which consists of 5 stages with duration of 30 minutes, 5 times a week for 4 weeks.

Stage 1- Coaching (the nurse researcher teaches the both students)

Stage 2- interaction between peers (first child to second child)

Stage 3- Change roles ((second child to first child)

Stage 4- Practice the questionnaires by both 10 minutes after

Stage 5- Grading by researcher

Numeracy intervention programme:-

This is the teaching programme which consists of 5 grades, each grade for 5 days in a week with duration of 30 minute per day for 4 weeks.

I grade- Counting

II grade- Finding odd or even

III grade- Addition

IV grade- Subtraction

V grade- Multiplication

Dyscalculia: - It refers to an inability to effectively connect with number and mathematics. It may include difficulties recognizing, reading, writing, mathematical concepts and their inter-relationship among 2^{nd} and 3^{rd} standard schoolers.

DELIMITATION

The study will be delimited to,

1. Assess the effectiveness of peer assisted learning strategies and Numeracy Intervention Programme
2. Identify the changes in Dyscalculia
3. Schooler
4. Selected school at Madurai district".

CONCEPTUAL FRAMEWORK

Modified Orlando's deliberate nursing process model

A conceptual frame work refers to a frame work of prepositions for conducting research.

Conceptual frame work provides clear description of variables suggesting ways or method to conduct the study and guiding the interpretation, evaluation and integration of study findings, **(Polit and Hungler, 2017)**

Wood and Helper (2012), states that, "when conducting research a theoretical frame work serves as a guide of map to systematically identify a logical, precisely defined relationship between the variables".

Orlando's deliberate nursing process model was selected for this present study. In this theory the nurse reacts to patient's behavior by ascertaining both the meaning of the distress and what would alleviate the distress.

Orlando's deliberate nursing process model consists of three components namely,

- Patient behavior
- Nurse reaction
- Nurse's action.

Patient behavior

According to theory, patient behavior means, patient feels helpless and person's behavior reflects his feelings. It can be verbal (expressed by language such as complaints, requests, demands or refusals), and non-verbal (manifested physiologically such as pain, stiffness or motor activity or vocally such as crying).

In this study the patient behavior is expressed by verbal and non verbal dyscalculia symptoms such as

- Difficulty in counting objects
- Difficulty in mental calculation
- Inability to grasp and remember mathematics concepts, rules etc.

Nurse Reaction

According to the theory, nurse reaction to a patient behavior form, the basis for determining how a nurse acts.

In this present study, the researcher screening the level of dyscalculia by using Questionnaires for dyscalculia and planning to give some intervention programme among schooler with dyscalculia in experimental group I and experimental group II.

Nurses Action

According to the theory nurse activity can be automatic (decided on for reason other than the patient's immediate need) or deliberative (resulting from

correctly identifying patient's need through validation of an interpretation made from the patient's behavior).

In this present study nurse's deliberative action is to assess the level of dyscalculia with the help of numeracy intervention programme.

The researcher divided group into two. In group I, the researcher evaluated the effectiveness of peer assisted learning strategies and in group II the researcher evaluated effectiveness of numeracy intervention programme.

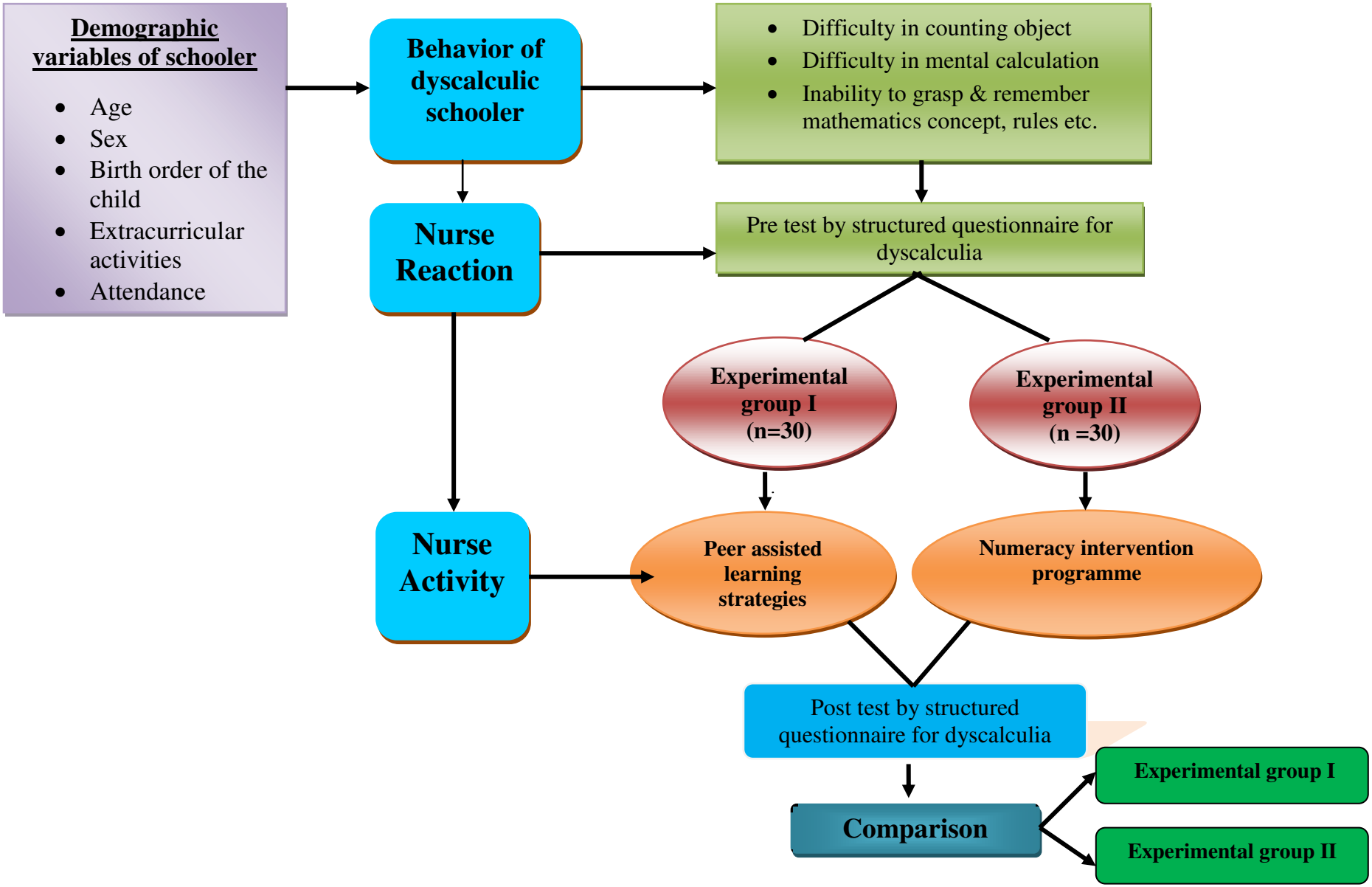


Fig 1.1 Conceptual framework on Orlando's Deliberate Nursing Process Model

CHAPTER – II

REVIEW OF LITERATURE

The review of literature is a broad, comprehensive, in depth, systematic, and critical review of scholarly publication, unpublished scholarly print materials and personal communications.

A literature review is a written summary of the state of existing knowledge on a research problem. The task of reviewing research literature involves the identification, selection, critical analysis and written description of existing information on a topic, (**Polit and Hungler, 2017).**

The review of literature is organized under the following headings

I. Studies related to Learning disabilities

II. Studies related to Dyscalculia

III. Studies related to Peer Assisted Learning Strategies

IV. Studies related to Numeracy Intervention Programme

V. Studies related to Peer Assisted Learning Strategies on Dyscalculia

VI. Studies related to Numeracy Intervention Programme on Dyscalculia.

I. STUDIES RELATED TO LEARNING DIABILITIES

Harlaar N (2016) conducted a cohort study to fine out the association between word recognition ability and inheritance among twins from 1994-2000, among twins born in England and Wales. The sample size was 3909 children the data was collected by telephonic interview using a test of word reading efficiency as the tool for data collection. In the study, both normal variations on word recognition and impaired word recognition abilities were found to be inherited in the children. The result showed that genetic influence was more in boys than girls.

Karande S (2016) conducted Prospective observational study on Clinical and psycho educational profile of children with specific learning disability (SpLD) and co-occurring attention-deficit hyperactivity disorder at Lokmanya Tilak Municipal Medical College and General Hospital, Mumbai with the aim to document the clinical profile and academic history of children with specific learning disabilities and co-occurring Attention Deficit Hyperkinetic Disorder. The study results shown mean age of children was 11.4 years. 30% children had a significant perinatal history, 24% had delayed walking, 22% had delayed talking, 10% had microcephaly, 54% displayed soft neurological signs and 20% had primary nocturnal enuresis. Their academic problems were difficulties in writing (96%), inattentiveness (96%), and difficulties in mathematics (74%), hyperactivity (68%) and difficulties in reading (60%). The researcher concluded that Children with specific learning disabilities and co-occurring Attention Deficit Hyperkinetic Disorder need to be identified at an early age to prevent poor school performance and behavioral problems.

Rama. S. Gowramma (2015) conducted cross-sectional multi-staged stratified randomized sampling study in J N Medical College, Belgaum to measure the prevalence of specific learning disabilities such as dyslexia, dysgraphia and dyscalculia among primary school children. It was conducted among children aged 8-11 years from third and fourth standard. The prevalence of specific learning disabilities was 15.17% in sampled children, whereas 12.5%, 11.2% and10.5% had dysgraphia, dyslexia and dyscalculia respectively. The study concludes the prevalence of specific learning disabilities is at the higher side of previous estimation in India.

Vijaylaxmi V Mogasale (2015) conducted a descriptive study to the incidence of dyslexia in Indian population. The aim was to establish the inheritance pattern of dyslexia in 23 families from Maharashtra. Individuals with above 8 years of age, normal performance intelligence quotient (>85) and remarkable deviation in reading and writing skills compared to chronological age were considered for the study. Based on the affectedness, the dyslexia phenotypes were classified into types: severe reading spelling deficit, mild reading spelling deficit, severe spelling deficit and mild spelling deficit. Severe dyslexia phenotypes were more frequent than mild phenotypes. The study concluded that the family history of dyslexia is a consistent risk factor the knowledge can be applied to the prevention and remediation of dyslexia.

Minamur chowdhary (2014) conducted a study on clinical and psycho educational profile of children with specific learning disability. Prospective observational design was used on 50 consecutively diagnosed children (34 boys and

16 girls). Detail clinical, academic history, physical and neurological examination findings were noted. The mean age of children was 11.4 years (±SD 2.5, range 7-17.1) The academic problems were difficulties in writing (96%), difficulties in mathematics (74%) and difficulties in reading (60%) All children had poor school performance, 15 (30%) had already experienced class retention. The study concluded that children with specific learning disabilities need to be identified at an early age to prevent poor school performance.

Lusia A .K (2014) conducted a study on children with reading problems in first grade who are more likely to experience behaviour problems in third grade and Second. Multilevel logistic regression modelling was used to analyze data from the Early Childhood Longitudinal Study-Kindergarten Class (ECLS-K). After statistically controlling for a wide range of potential confounds, they found that children with reading problems in first grade were significantly more likely to display poor task engagement, poor self-control, externalizing behavior problems, and internalizing behavior problems in third grade. They also found that children displaying poor task engagement in first grade were more likely to experience reading problems in third grade. Collectively, the findings suggest that the most effective types of interventions are likely to be those that target problems with reading and task-focused behaviors simultaneously.

Visudhiphan P (2014) conducted a study to compare the cognition abilities of children with specific learning disability (SpLD) viz. dyslexia, dysgraphia and dyscalculia with those of non-impaired children. The study group consisted of 95 newly diagnosed SpLD children (aged 6-14 years) and the control group consisted

of 125 non-impaired children (aged 6-14 years). A battery of 13 cognition function tests based on Guilford's Structure of Intellect Model was administered individually on each child in four areas of information viz. figural, symbolic, semantic and behavioural. Mean scores +/- SD obtained in these four areas were calculated in both groups and compared using independent Samples t-test. A P value < 0.05 was considered significant. Children with SpLD had significantly lower scores (mean +/- SD) in all four areas of information: maximally in the symbolic area (18.66 +/- 4.83 vs. 28.30 +/- 4.29, mean difference 9.64, P < 0.0001, df = 218, 95% CI 8.43-10.86), followed by semantic (18.72 +/- 5.07 vs 27.36 +/- 4.17, mean difference 8.64, P < 0.0001, df = 218, 95% CI 7.40-9.87), figural (17.10 +/- 5.24 vs. 25.14 +/- 3.36, mean difference 8.04, P < 0.0001, df = 218, 95% CI 6.89-9.19), and behavioural (5.68 +/- 2.10 vs. 7.54 +/- 1.46, mean difference 1.86, P < 0.0001, df = 218, 95% CI 1.39-2.33) areas. Cognition abilities were significantly impaired in children with SpLD.[12]

Riddell P (2013) conducted a study to assess the impact of the provisions of the Maharashtra government on the academic performance of children with specific learning disability (SpLD) at the Secondary School Certificate (SSC) board examination. The academic performance of 60 children (45 boys, 15 girls) at the SSC board examination with benefit of chosen provisions was compared with their performance at their last annual school examination before diagnosis of SpLD. There was a significant improvement in their mean percentage (%) total marks scored at the SSC board examination as compared with the mean % total marks scored by them at their last annual school examination before the diagnosis (63.48 +/- 7.86 vs. 40.95 +/- 7.23) [mean +/- SD, mean % difference = 22.53, 95% CI =

19.8 - 25.26, P. It was thus concluded that Children with SpLD who availed the benefit of provisions showed a significant improvement in their academic performance at the SSC board examination.

Turnbull Patricia (2013) conducted a study to identify the prevalence of dyslexia among first to sixth standard students. A total of 486 students were administered "Raven's progressive Matrices test" for estimation of intellectual functioning. The prevalence of dyslexia and probable dyslexia were found to be 6.3 and 12.6 percent, respectively. The dyslexia group had significantly lower Thai language scores than those of the normal group (P<0.05). Mean verbal intellectual quotient. Score in the dyslexia group assessed by using Wechsler Intelligence Scales for Children 76+\-7. The co morbid ADHD was 8.7 percent in the dyslexia group. The study concluded that Dyslexia is a common problem among primary school students

Brumini G (2012) conducted a prospective questionnaire based study to investigate the parental knowledge of specific learning disability in school going child and to evaluate the impact of an educational intervention on it. 50 parents who were conversant in English and willing to follow-up were interviewed. Pre and post intervention responses were compared by using Chi-square test. After the intervention, there was significant improvement in parental knowledge of the meaning of the term Specific Learning Disability (32/50 vs. 50/50, p<0.0001)

Sawant S (2011) conducted a study to examine the effectiveness of nonprofessional tutors in a phonologically based reading treatment similar to those in which successful reading outcomes have been demonstrated. Participants were 23

first graders at risk for learning disability who received intensive one-to-one tutoring from non certified tutors for 30 minutes 4 days a week for one school year. Tutoring include instruction in phonological skills, letter sound correspondence, explicit decoding, rhyme analysis, writing, spelling, and reading phonetically controlled text. Finding suggests that phonologically based reading instruction for first graders at risk for learning disability can be delivered by non teacher tutors. Thus discussion addresses the character of reading outcomes associated with tutoring, individual in responses to treatment and the infrastructure received for nonprofessional tutoring programs.

Executive Summary of National Research Council (2010) in a study showed that, Learning Disability does not fall evenly across racial and ethnic group. 1% of white children and 2.6% of non Hispanic black children were receiving Learning Disability related specific education services. It is also estimated that Dyspraxia affect at least 2% of general population and about 70% of those affected are males. But 60% of them remained undiagnosed.

Margot P (2010) conducted a longitudinal study with case and control among 300 children who are 11-12 years age from rural and urban areas of Victoria, Australia. The Child Assessment Schedule Revised was used to assess the behaviour and learning disabilities of these children. The research findings revealed that 32.5% hard difficulty in handling maths and 42% hard spelling errors. Children with arithmetic disabilities had higher rates of behavior disorders than children with spelling disorders (65% versus 48%). The teacher opined that the academic

performance, attitude and maturation of children were also influenced by their learning disabilities.

Kohli A (2009) conducted study on Specific learning disabilities in children: deficits and neuropsychological profile at Postgraduate Institute of Medical Education and Research, Chandigarh. The study involved 35 children in the age range of 7-14 years (both boys and girls) who were diagnosed clinically and assessed using the battery of tests for specific learning disabilities and neuropsychological tests consisting of the PGIMER memory scale for children, the Wisconsin card sorting test, the Bender visuo-motor gestalt test and Malin's intelligence scale for Indian children. The study results revealed that deficits in language and writing skills and impairments in specific areas of memory, executive functions and perceptuo-motor tasks.

Stojanovik V (2008) conducted study on Expressive versus receptive language skills in specific reading disorder in United Kingdom gated the difference between expressive and receptive language skills in a sample of 17 children with specific reading difficulty aged between 7 and 12 years. The study samples were administered a battery of two receptive and two expressive language measures. The results of the study shown that as the neuro-anatomical model would predict, the children scored significantly lower on tests of receptive than on tests of expressive language skills.

II. STUDIES RELATED TO DYSCALCULIA

Rothman RL (2017) conducted a Cross-sectional study of Spanish-speaking caregivers of young children (<30 months) enrolled at primary care clinics in 4 academic medical centres. Caregivers were administered the 10-item in addition to validated tests of health literacy and numeracy. Psychometric analysis was used to assess its correlation with socio demographics and performance on literacy/numeracy assessments. Of 176 caregivers, 77% had adequate health literacy whereas only 0.6% had 9th grade or greater numeracy skills. Mean score was 41.6% (SD 21.1). Fewer than one-half (45.5%) were able to read a liquid antibiotic prescription label and demonstrate how much medication to administer within an oral syringe. Less than one-third (31.8%) were able to interpret a food label to determine whether it met WIC (Special supplemental nutrition program for Women, Infants, and Children) guidelines. Internal reliability was good (Kuder-Richardson coefficient of reliability; KR-20 = 0.61). An 8-item scale was highly correlated with the full 10-item scale ($r = 0.97$, $P < .001$), with comparable internal reliability (KR-20 = 0.64). The study concluded that many Spanish-speaking parents have difficulty performing health-related literacy and numeracy tasks.

Peterson MG (2016) conducted a prospective study on Cognitive impairment in children and adolescents with systemic lupus erythematosus (SLE) can affect intelligence, academic achievement, arithmetic and complex problem solving ability. In this prospective two-centre study, the researcher examined children's (and adolescents') and parents' perception of the impact on school; the relationship between child and parent reports on school-related issues; and the relationship

between health-related quality of life and school-related issues. Forty-one patients (73% girls) with mean age of 15 ± 3 years and 32 parents participated. Mean school domain scores for child and parent reports were lower compared with total and subscale scores. Patients reported difficulty with schoolwork, had problems with memory and concentration, Eighty-three percent of patients felt that they would have done better in school Moderate correlations ($r = 0.3$-0.4) were found between total score and the following items: satisfaction with school performance, interest in schoolwork, remembering what was learned, and concentrating in class. Patients on intravenous chemotherapeutic medications missed more school days ($p < 0.05$) compared with patients on oral medications. Also, patients with a greater number of missed school days had increased disease activity ($p = 0.008$).

Grantham-McGregor S (2016) conducted a experimental study on Children who were stunted at age 9 to 24 months and had taken part in a 2-year intervention programme of psychosocial stimulation with or without nutritional supplementation were re-examined at age 11-12 years and compared with non-stunted children from the same neighbourhoods. Their school and home behaviours were assessed using the Rutter Teacher and Parent Scales and school achievement was measured using the Wide Range Achievement Test (WRAT) and the Suffolk Reading Scales. No significant intervention effects were found among the stunted groups. Thus data from the four intervention groups were aggregated for subsequent analyses, comparing all 116 stunted children with 80 non-stunted children. Controlling for social background variables, the stunted group had more conduct difficulties ($p < .05$) as rated by their parents. They also had significantly lower scores in arithmetic, spelling and word reading than the non-stunted children (all $p <$

.001). The study concluded that controlling for the children's IQ, the stunted children's arithmetic scores remained significantly lower than those of the non-stunted children.

Hoard MK (2015) conducted a experimental study that Children's (N=275) use of retrieval, decomposition (e.g., 7=4+3 and thus 6+7=6+4+3), and counting to solve additional problems was longitudinally assessed from first grade to fourth grade, and intelligence, working memory, and in-class attentive behavior was assessed in one and two grades. The goal was to assess the relation between capacity of the central executive component of working memory, controlling for intelligence and in-class attentive behavior, and grade-related changes in children's use of these strategies. The results remained robust with controls for children's sex, race, school site, speed of encoding Arabic numerals and articulating number words, and mathematics achievement in kindergarten. The results also revealed that intelligence and in-class attentive behavior independently contributed to children's strategy development.

Thompson L (2015) that whether mathematics fluency was independent from untimed mathematics and from reading using 314 pairs of school-aged twins drawn from the Western Reserve Reading and Mathematics Projects. Twins were assessed through a 90-min home visit at approximately age 10 and were reassessed in their homes approximately 1 year later. Results suggested that the shared environment and genetics influenced the covariance among mathematics fluency, untimed mathematics measures, and reading measures.

Geary DC (2014) conducted a study which reveal that Using 4 years of mathematics achievement scores, groups of typically achieving children (n = 101) and low achieving children with mild (LA-mild fact retrieval; n = 97) and severe (LA-severe fact retrieval; n = 18) fact retrieval deficits and mathematically learning disabled children (MLD; n = 15) were identified. Multilevel models contrasted developing retrieval competence from second to fourth grade with developing competence in executing arithmetic procedures, in fluency of processing quantities represented by The retrieval deficits of LA-severe fact retrieval children were at least as debilitating as those of the children with MLD and showed less across-grade improvement. The deficits were characterized by the retrieval of counting string associates while attempting to remember addition facts, suggesting poor inhibition of irrelevant information during the retrieval process. The study suggests a very specific form of working memory deficit, one that is not captured by many typically used working memory tasks.

Martins CL (2014) conducted a experimental study in which thirty-five patients were included (20 male, 15 female). Age distribution: <3-year-old--4; 3-6 year-old--3;>6-year-old--28. Cognitive and psychological evaluation was performed in 12 cases. Mean IQ was 87. Attention-deficit-hyperactivity disorder was present in 40% (14/35) of all cases. Learning disabilities were identified in 48% of cases however only nine children had specifically educational programming. Visuo spatial deficits were present in 5/35 children, reading deficits in 4/35, graph motor deficits in 4/35.

Choudhary M, Jain A (2013) conducted a case control study on the prevalence of learning disorders in school going children and to compare the socio-demographic variables and other related factors with learning disorder All the 500 students of class III to V with all sections were given the dyscalculia assessment questionnaire (DAQ) to fill; 468 students returned the completed forms. Statistical analysis was done using chi-square test. Only 68 children scored ≥ 4 on DAQ were given MISIC (Mallin's intelligence scale for Indian children) for IQ assessment and DST-J for dyscalculia screening. Forty-eight students were labelled as dyslexia and further diagnosis was confirmed by DSM IV- TR classification. Prevalence of learning disorders (LD) was found to be 10.25% with higher in males than females (11.40% vs. 7.14%).The delivery complications (20.83% vs. 4.17%; X 2-4.667, p value-0.031) were more in LD and more family members were left handed (16.67% vs. 2.08%; X 2-4.41, p value-0.036) as compared to control group. In classroom behaviour, children with LD asked questions less (10.42% vs. 75%; X 2-40.91, p value-0.0001), answered questions less frequently (6.25% vs. 79.16%; X 2-52.15, p value-0.0001) and took notes less attentively than control group (4.17% vs. 58.33%; X 2-32.77, p value-0.0001).

Schabmann A (2013) conducted a cross sectional study on 262 typically developing and 51 dyscalculia children on grades 2, 3, and 4 to find deficits in basic numerical processing as a central and potential casual problem in developmental dyscalculia. Findings indicate that the efficiency of number processing improves over time and that of dyscalculia children are with typical development. Dyscalculia children did not show a size congruity effect as shown in typical development but shoed a more marked compatibility effect for 2 digit number.

Nunes T (2012) conducted a longitudinal study to assess whether mathematical reasoning and arithmetic make independent contributions to the longitudinal prediction of mathematical achievement over 5 years and to test the specificity of this prediction Data from Avon Longitudinal Study of Parents and Children (ALSPAC) were available on 2,579 participants for analyses and 1,680 for the analyses achievement in mathematics, Age and working memory were controls in these analyses Mathematical reasoning and arithmetic did make independent contributions to the prediction of mathematical achievement; mathematical reasoning was by far the stronger predictor of the two. They implicated that schools must plan explicitly to improve mathematical reasoning as well as arithmetic skills.

Pieter's (2012) conducted a longitudinal study to assess the ability to compare numbers, as the most basic form of number sense, has been related to arithmetical achievement sixteen children with mathematical disabilities (MD), 64 low achievers (LA), and 315 typical achieving (TA) children were followed from kindergarten till grade 2. The association of comparison skills with arithmetical skills in grades l and 2 was studied. The performances of MD, LA and TA children were compared. Regression analyses showed that non-symbolic skills in kindergarten were predicatively related to arithmetical achievement 1 year later and fact retrieval 2 years later. Children with MD already had deficits in non-symbolic and symbolic. The combination of non-symbolic and symbolic deficits represents a risk of developing MD.

Purpura (2010) stated that Children's early mathematics skills develop in a cumulative fashion; foundational skills form a basis for the acquisition of later skills. However, non-mathematical factors such as working memory and language skills have also been linked to mathematical development at a broad level. Unfortunately, little research has been conducted to evaluate the specific relations of these two non-mathematical factors to individual aspects of early mathematics. Thus, the focus of this study was to determine whether working memory and language were related to only individual aspects of early mathematics or related to many components of early mathematics skills. A total of 199 4- to 6-year-old preschool and kindergarten children were assessed on a battery of early mathematics tasks as well as measures of working memory and language. Results indicated that working memory has a specific relation to only a few-but critically important-early mathematics skills and language has a broad relation to nearly all early mathematics skill.

III. STUDIES RELATED TO PEER ASSISTED LEARNING STRATEGIES

Doughlas, et.al. (2017), conducted the study to determine the effectiveness of a class wide peer tutoring program in reading for three learner types: low achievers with and without disabilities and average achievers. Twelve schools, stratified on student achievement and family income, were assigned randomly to experimental and control groups. Twenty teachers implemented the peer tutoring program for 15 weeks; 20 did not implement it. In each of the 40 classrooms, data were collected systematically on three students representing the three learner types. Pre- and post treatment reading achievement data were collected on three measures

of the Comprehensive Reading Assessment Battery. Findings indicated that, irrespective of type of measure and type of learner, students in peer tutoring classrooms demonstrated greater reading progress. Implications for policymaking are discussed.

Lynh (2016), examined the effects of peer-assisted learning strategies (PALS) on students' literacy development and beliefs about reading, when PALS is implemented with secondary-level students in remedial and special education classes. Teachers were assigned to PALS (n = 9 classes) and contrast (n = 9 classes) treatments. Teachers implemented PALS with their entire classes five times every 2 weeks, for 16 weeks. To designate research participants for outcome measurement, teachers identified all students whose reading instructional levels were Grades 2 through 6. Reading comprehension and fluency were measured before and after treatment; beliefs were indexed after treatment. Analyses of variance indicated that, compared to contrast counterparts, PALS students grew more on reading comprehension and reported more positive beliefs about working hard to improve reading. However, PALS and contrast students grew comparably on reading fluency and reported similar beliefs about being and wanting to become better readers. Implications are discussed for developing effective forms of peer-mediated instruction for use in high school remedial and special education classes.

Laura (2013), assessed the effects of Peer-Assisted Learning Strategies (PALS), a reciprocal classwide peer-tutoring strategy, on the reading performance of native Spanish-speaking students with learning disabilities (LD) and their low-, average-, and high-achieving classroom peers. Participants were 132 native

Spanish-speaking English language learners (ELL) in Grades 3 through 6, along with their 12 reading teachers. Teachers were assigned randomly to PALS and contrast groups. PALS sessions were conducted 3 times a week for 15 weeks. Students were tested before and after treatment. PALS students outgrew contrast students on reading comprehension, and those effects were not mediated by student type.

IV. STUDIES RELATED TO NUMERACY INTERVENTION PROGRAMME

Rodriguez V (2016) conducted cross sectional study which reveals high levels of inadequate health literacy and numeracy in African Americans. The authors aimed to investigate the distribution of health literacy, numeracy, and graph literacy in these populations. They conducted a cross-sectional survey of veterans receiving outpatient care and measured health literacy, numeracy, graph literacy, shared decision making, and trust in physicians. Participants were 502 school children (7-9 years). Low, marginal, and adequate health literacy were found in, respectively, 29%, 26%, and 45% of the children. The authors found a significant main effect of race qualified by an age and race interaction. Younger African Americans had lower health literacy ($p < .001$), graph literacy ($p < .001$), and numeracy ($p < .001$) than did Whites, even after the authors adjusted for covariates.. African Americans expressed dissatisfaction with their current role in decision making ($p = .03$). In conclusion, African Americans may be at a disadvantage when reviewing patient education materials, potentially affecting health care outcomes.

Dellatolas G (2016) conducted a Neuropsychological studies of dyscalculia patients show that arithmetical development is not a one-dimensional process. In transcultural investigations, cultural, educational and linguistic factors might affect differently the various components of mathematical development. Four hundred and sixty schoolchildren aged 7 to 10 years from Brasilia, Brazil (n = 141), Paris, France (n = 160) and Zurich, Switzerland (n = 159) were asked to perform eleven number processing and calculation tasks. Chronological age, which was almost confounded in this study to educational level, had a strong effect on some tasks (knowledge of the written code of numbers, number comparison, mental calculation, problem solving), but only a slight effect on other tasks (counting dots, counting backwards, estimation). The study revealed that evidence from developmental studies has to be integrated into theoretical models of calculation and number processing, which are presently based mainly on results from neuropsychological studies of dyscalculia patients.

Petermann F (2015) stated that the aim of the study was to determine the role of precursors in the prediction of school achievement. 372 children were followed from health examination for school entry to the second grade. Preschool skills assessed by a screening of developmental stage. Correlations between numeracy and mathematics abilities (r=0,340) met the researcher's expectations and also did those between verbal abilities and spelling (r=0,276). The subtests of attention and counting contribute significantly to an explanation of the variance in school achievement. The study concluded that Numeracy predicts mathematics achievement, and verbal memory contributes to school achievement in mathematics and spelling.

V. STUDIES RELATED TO PEER ASSISTED LEARNING STARTEGIES ON DYSCALCULIA

Mary Beth, et.al. (2016), examined the effects of peer-assisted learning strategies (PALS) and curriculum-based measurement (CBM) on the mathematics performance of secondary students with disabilities. Ten classes with 92 students in Grades 9 through 12 participated. All students were significantly below grade level and received mathematics instruction in self-contained resource rooms. Classrooms were randomly assigned to PALS/CBM or the classroom mathematics program (control). PALS/CBM was implemented twice weekly and CBM was conducted weekly for 15 weeks. PALS/CBM students improved their computation mathematics skills significantly more than control students, but no significant difference was found on concepts/application mathematics skills. On questionnaires, teachers and students indicated that they (a) liked using PALS (b) felt PALS was helpful in increasing mathematics skills (c) thought CBM graphs increased motivation to work hard in math, and (d) would like to participate in PALS/CBM again. Results are discussed with respect to research and practice.

Fuchs, et.al. (2016), examined the effects of classwide peer-assisted learning strategies (PALS) in mathematics incorporating the use of curriculum-based measurement on the acquisition and transfer learning of low- and average-achieving 2nd–4th graders, and those with an identified learning disability. Ss were randomly assigned to treatments with and without PALS on a mathematics operations curriculum, and pretested and posttested for mathematics operations and concepts/applications. ANOVA indicated superior mathematics growth for Ss in the

PALS condition. Patterns in the data, however, suggested the need for additional research on low-achieving and learning disabled transfer from the operations tutoring content to the broader mathematics curriculum and on the effects of PALS on conceptual and applications portions of the mathematics curriculum

Catherine (2015) conducted a meta analysis to summarize the effectiveness of peer-mediated interventions on the mathematics performance of both students with disabilities and those at risk for mathematics disabilities. Meta-analytic techniques were used to calculate mean effect sizes for 17 studies that met inclusion criteria. Results indicate that peer-mediated interventions in mathematics are moderately effective for improving students' mathematics performance. Also, findings are strongest for students at risk for mathematics disabilities, elementary-aged participants, and mathematics computation content. Recommendations for future research and practical implications are discussed.

VI. STUDIES RELATED TO NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA

Roberts, Greg (2014) conducted a study to determine the effects of an early numeracy preventative Tier 2 intervention on the mathematics performance of first-grade students with mathematics difficulties. Researchers used a pretest-posttest control group design with randomized assignment of 139 students to the Tier 2 treatment condition and 65 students to the comparison condition. Systematic instruction, visual representations of mathematical concepts, purposeful and meaningful practice opportunities, and frequent progress monitoring were used to develop understanding in early numeracy skills and concepts. Researchers used

progress-monitoring measures and a standardized assessment measure to test the effects of the intervention. Findings showed that students in the treatment group outperformed students in the comparison group on the progress-monitoring measures of mathematics performance and the measures that focused on whole-number computation. There were no differences between groups on the problem-solving measures.

Liana (2013), conducted the experimental study to assess the effectiveness of numeracy intervention programme on developmental dyscalculia. The preliminary results of this study suggested that children with developmental dyscalculia benefit from a numeracy intervention program that focuses on basic numerical knowledge and conceptual knowledge. All children in the experimental group showed considerable and partly significant performance increases on all calculation components. Six children with developmental dyscalculia were trained individually and in small-group settings for a relatively short duration (one school semester) and argued that the positive intervention effects to a large extent are attributable to the explicit teaching of numerical domains that often have been found to be neglected in school mathematics.

CHAPTER – III

METHODOLOGY

Abdullah (2017) said that, methodology is a significant part of any study which enables the research to project the research undertaken.

Research methodology is a systematic way to solve the research problem and also to carry out the academic study and research in a correct manner (**Polit and Beck, 2016)**

This chapter includes Research approach, research design, setting of the study, population, sample, sample size, sampling technique, developing and description of the tool, content validity, and reliability of tool, method of data collection and plan for data analysis and interpretation of the data.

RESEARCH APPROACH

The research approach is a basic procedure for the conduction of research study (**B.T. Basavanthappa, 2016).**

"Quantitative Evaluative research approach" is selected for the present study.

RESEARCH DESIGN

It refers to the overall plan for addressing a research question, including specifications for enhancing the integrity of the study (**Polit & Beck, 2016).**

The research design selected for the present study was Factorial Research Design" to assess the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among Schooler in selected school.

Factorial research design: - It refers to an experiment in which the effectiveness of two different treatments are compared. Each treatment is applied in many experimental units instead of one. By doing so that statistical accuracy of the experiments is increased.

Figure- 3.1 Diagrammatic representation of research design

Randomly allocated schooler	Pre test	Treatment	Post test
Experimental group I	O_1	X_1	O_2
Experimental group II	O_1	X_2	O_2

SYMBOLS:-

O_1- Pre-test on dyscalculia among schooler in experimental group I and II

X_1 – Peer Assisted Learning Strategies

X_2 - Numeracy intervention programme

O_2- Post-test on dyscalculia among schooler in experimental group I and II

SETTING OF THE STUDY

Research settings are specific places in a research where data collection is to be made. The selection of setting was done based on feasibility of conducting the study, availability of subject and permission of authorities **(Polit and Beck, 2017).**

The study was conducted in **"Panchayat Union Primary school at Uvari, Madurai district".**

VARIABLES

Variables are characters that can have more than one value. The categories discussed in a present study are:

Independent variable

According to **Polit and Hungler (2017),** the variable that is believed to care or influence the behaviour and ideas.

In this present study, the independent variables are peer assisted learning strategies and numeracy intervention programme.

Dependent Variable

According to **Polit and Hungler (2017),** the dependent variable is the researcher is interested in understanding, explaining, and proceeding.

In this present study, the dependent variable refers to dyscalculia among schooler.

POPULATION

Population refers to the entire aggregation or totality of all the objects, subjects or number that confirm to a set of specification. **(Polit and Beck, 2017)**

The population for the present study was schooler.

SAMPLE

A sample is the portion of the population that has been selected to represent the population of interest (**Talbott, 2014).**

The sample for the present study was schooler from selected school at Madurai district".

SAMPLE SIZE

Sample size is normally decided by nature of the study, nature of the population, type of sampling technique, total variable, statistical test adopted for data analysis and sensitivity measures and attrition (**Polit and Beck, 2017)**

The total sample size selected for this was 60 Students out of which 30 Students from experimental group I and 30 Students from experimental group II.

SAMPLING TECHNIQUE

According to **Polit and Beck (2017),** sampling technique refers to the process of selecting a portion of the population to represent the entire population.

In this present study **"Simple random sampling technique"** was used to select the schooler with dyscalculia from 2nd and 3rd standard.

CRITERIA FOR SAMPLE SELECTION

a) Inclusion criteria

The schooler with

1. both genders
2. dyscalculia score below 15
3. who is present during the period of data collection
4. students of II and III standards
5. students who are willing to participate

b) Exclusion criteria:-

The schooler with

1. Irregular attendance
2. Physical illness

DEVELOPMENT OF TOOL

The investigator develops a structured questionnaire regarding schooler's mathematical skills. The tool is finalized based on response during preliminary study and suggestion from experts.

SECTION A:-

It consists of demographic characteristics of schoolers with dyscalculia. i.e., age in years, gender, birth order of child, academic performance, attendance**.**

SECTION-B: - This consists of a structured questionnaire for dyscalculia. This tool is useful to assess the level of dyscalculia in schooler.

SCORING PROCEDURE

Level of dyscalculia	Actual score	Percentage %
Severe	0-5	25%
Moderate	6-10	50%
Mild	11-15	75%
No dyscalculia	above15	100%

VALIDITY

The content validity refers to the degree to which an instrument measures what is supposed to measure (**Polit and Beck, 2017**).

The content validity of demographic variables and observational check list on dyscalculia was validating in consultation with guides and experts. The experts are paediatric and psychiatric nursing personnel, psychologist, school teachers and statisticians. The tool was modified according to the suggestions and recommendations of the experts.

RELIABILITY

According to **Polit and Beck (2017**), reliability of research instruments defined as the extent to which the instrument has the same results on repeated measures.

The reliability of the structured questionnaire was tested by implementing the tool on 6 schooler with dyscalculia who were studying Government Primary school, Madurai district which is other than the sample area. Test retest method was used to test the reliability of the tool and the tool was found to be reliable. **(r^1=0.95)**

DATA COLLECTION PROCEDURE

Data collection is the gathering of the information to address the research problem. The word "data" means information i.e. systematically collected in the course of study.

Talbott (2014) refers data collection as gathering of information from the sampling unit. The researcher plan typically specifies procedures for actual collection of data. The researcher must be sure that enough material is available to complete the study that the participants are informed that the schedules do not conflict.

Permission from the concerned authority

Prior to the collection of the data, permission was obtained from the Headmaster of selected School at Madurai District. The researcher

explained the purpose and method of the study in order to get the co-operation from the management.

Period of data collection

The data was collected 4 weeks. The investigator collected the data from the schoolers at selected school at Madurai district.

Pretest

Pretest was conduct on schooler in the schools by using Questionnaires for Dyscalculia to assess the level of dyscalculia. The class teachers gave the list of students who were studying in 2^{nd} and 3^{rd} standard. The identified dyscalculia children were randomized to experimental group I and experimental group II by lottery method.

Implementation of Peer Assisted Learning Startegies and Numeracy Intervention Programme:-

Implement the peer assisted learning strategies and numeracy intervention programme for randomly selected 2^{nd} and 3^{rd} students with the duration of 30 minutes for 4 weeks.

Post test

Post test was conducted for the subjects to assess the evaluation of numeracy intervention programme by using the Questionnaires for Dyscalculia which was assessed by the researcher after 4 weeks**.**

PLAN FOR DATA ANALYSIS

- Assess the level of dyscalculia among experimental group I and experimental group II of schooler in school before and after peer assisted learning strategies and numeracy intervention programme are analyzed by using frequency and percentage.

- Effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among experimental group I and experimental group II of schooler was analyzed by using mean, SD and mean percentage by using paired‘t’ test and unpaired ‘t’ test.

- Difference in effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among experimental group I and experimental group II of schooler was analyzed by using unpaired ‘t’ test.

- Association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II was analyzed by using Chi square test.

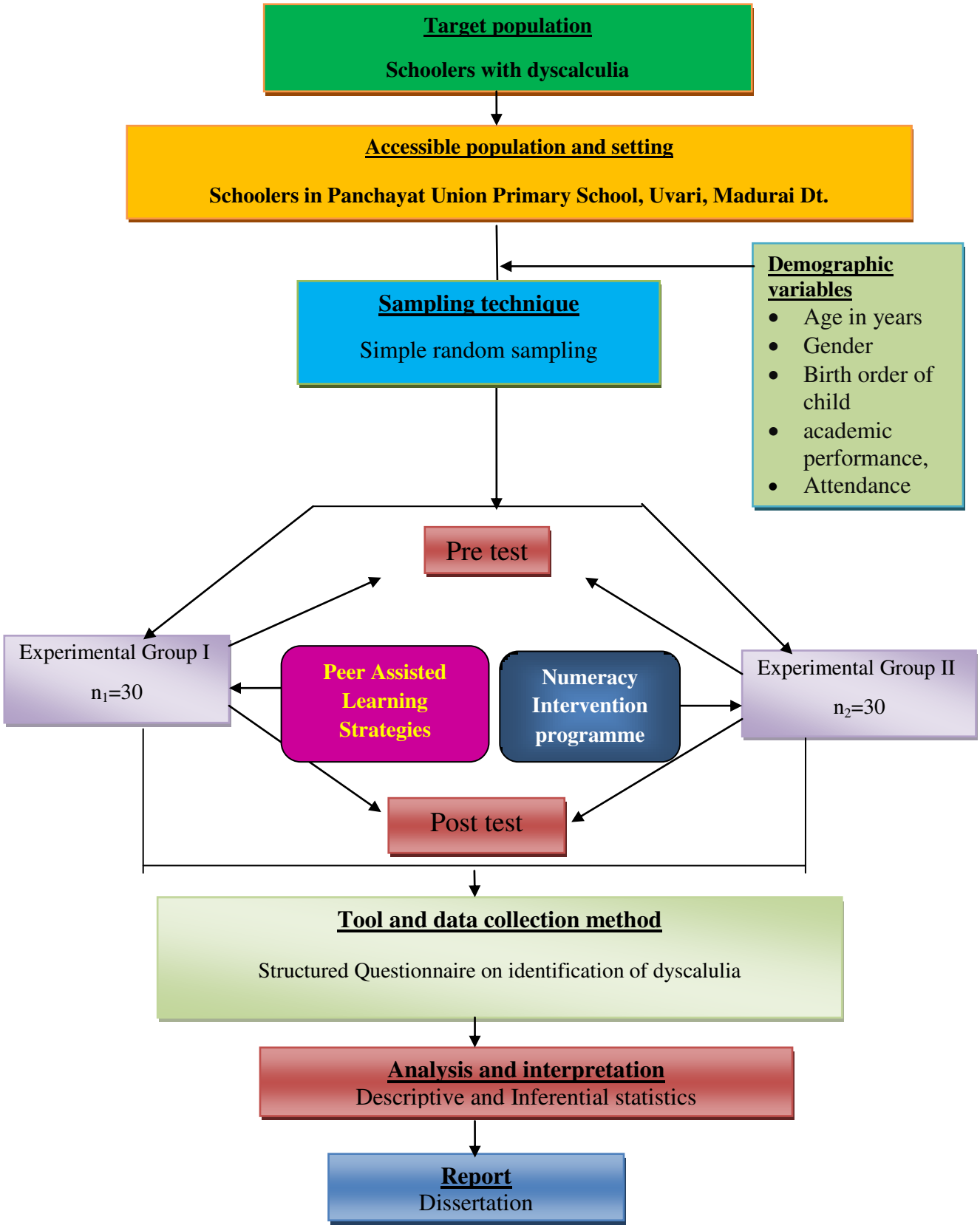


Fig. 3.1: SCHEMATIC REPRESENTATION OF RESEARCH METHODOLOGY

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

Analysis is a "process of organizing and synthesizing data in such a way that research questions can be answered and hypothesis tested" **(Polit and Hungler, 2017).**

Analysis enables the researcher to reduce, summarize, organize, evaluate, interpret and communicate numerical information (**Polit and Hungler, 2017).**

This chapter deals with the analysis and interpretation of data collected from 60 (30 experimental group I and 30 experimental group II) samples of schooler with dyscalculia at selected school at Madurai district.

The data were coded and analyzed as per objectives of the study under the following headings;

1. **Section A:**

    - Description of samples characteristics according to their demographic variables.

2. **Section B:** Assess the level of dyscalculia among experimental group I and experimental group II of schoolers before and after Peer Assisted Learning Strategies and numeracy intervention programme.

- Frequency and percentage distribution of the experimental group I and experimental group II pre and posttest scores of dyscalculia among schoolers

3. **Section C:** Determine the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schoolers in experimental group I and experimental group II.

   - Comparison of mean, SD, and mean percentage of experimental group I and experimental group II pre and posttest scores.

   - Paired‘t’ test value of experimental group I and experimental group I

   - Unpaired‘t’ test value of experimental group I and experimental group II.

4. **Section D**: Find out the association between posttest scores of dyscalculia among experimental group I and experimental group II of schooler with their demographic variables.

   - Chi-square value of association between the posttest scores of experimental group I and their demographic variables.

   - Chi-square value of association between the posttest scores of experimental group II and their demographic variables.

SECTION A: DESCRIPTION OF SCHOOLER ACCORDING TO THEIR DEMOGRAPHIC VARIABLES

Table 4.1: Frequency and percentage distribution of demographic variables in experimental group I and experimental group II .

(N_1=30, N_2=30)

Demographic Variables	Experimental group I		Experimental group II	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
AGE IN YEARS				
a) 6-7yrs	15	50	14	47
b) 8-9yrs	15	50	16	53
GENDER				
a) Male	17	57	15	50
b) Female	13	43	15	50
BIRTH ORDER OF THE CHILD				
a) First child	15	50	13	43
b) Second child	12	40	15	50
c) Third child	3	10	2	7
EXTRA CURRICULAR ACTIVITIES				
a) Good	15	50	16	53
b) Fair	10	33	9	30
c) Poor	5	17	5	17
ATTENDANCE				
a) Regular	22	73	21	70
b) Irregular	8	27	9	30

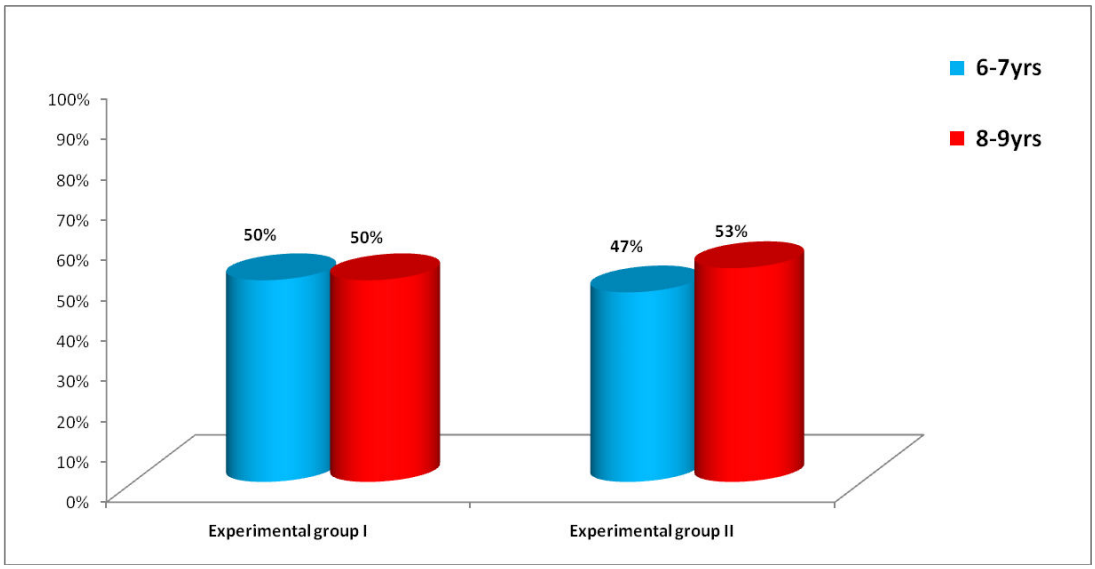


Figure 4.1: Cylinder Bar diagram showing the distribution of experimental group I and experimental group II sample according to their age group.

Distribution of experimental group I and experimental group II sample according to their age group depicts that the highest percentage (50% and 47%) of schooler were in the age group of 6-7 in experimental group I and in experimental group II. However 50% and 53% of schoolers were in the age group of 8-9 years in experimental group I and in experimental group II . It seems most of the dyscalculic children were in the age group of 8 – 9 years. **(Fig:4.1)**

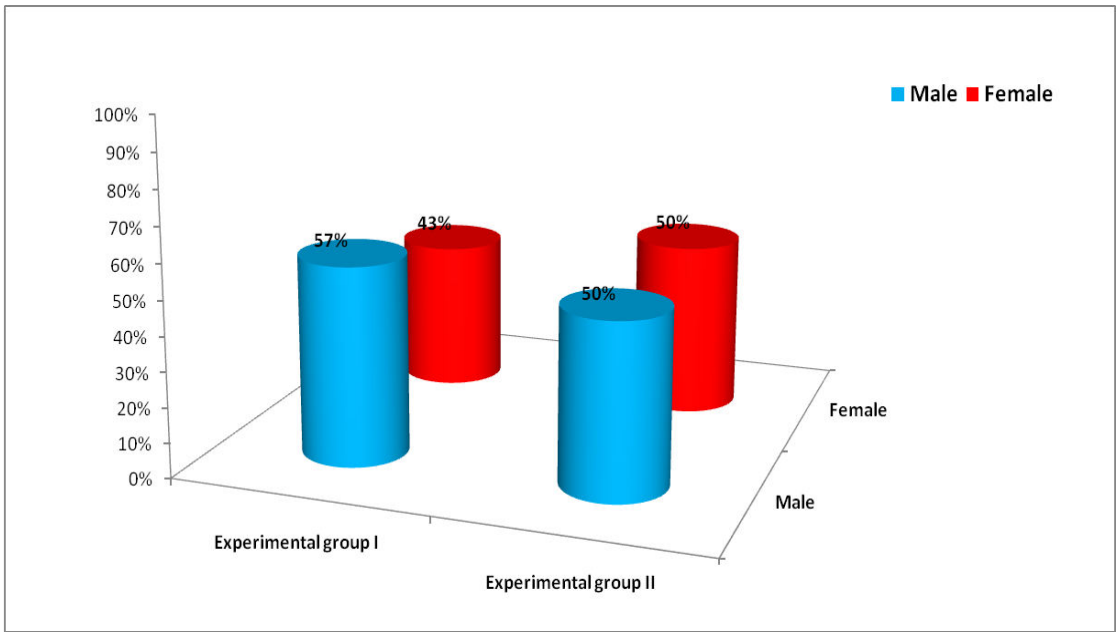


Figure 4.2: Cylinder diagram showing the distribution of experimental group I and experimental group II sample according to their sex.

Distribution of schooler according to their sex shows that the highest percentage (57% and 50%) of schoolers were male in experimental group I and experimental group II and 43% and 50% of children were female in both the experimental groups. It might be associated that males were affected more than females. **(Fig: 4.2)**

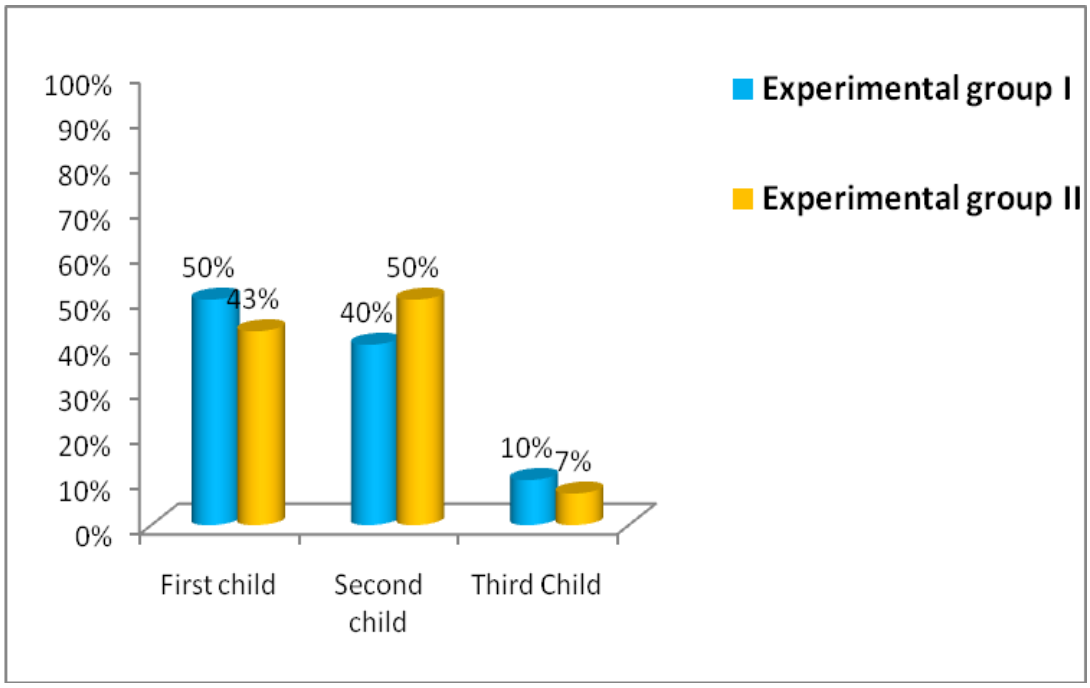


Figure 4.3: Bar diagram showing the distribution of experimental group I and experimental group II sample according to the Birth order of the child

Distribution of schooler according to their birth order depicts that half , means 50% and 43% of schooler were the first child in experimental group I. and experimental group 2, Whereas 40%and 50% of them were second child in experimental group I. and experimental group 2 respectively. It shows that no conclusion drawn from the birth order of the child. **(Fig: 4.3).**

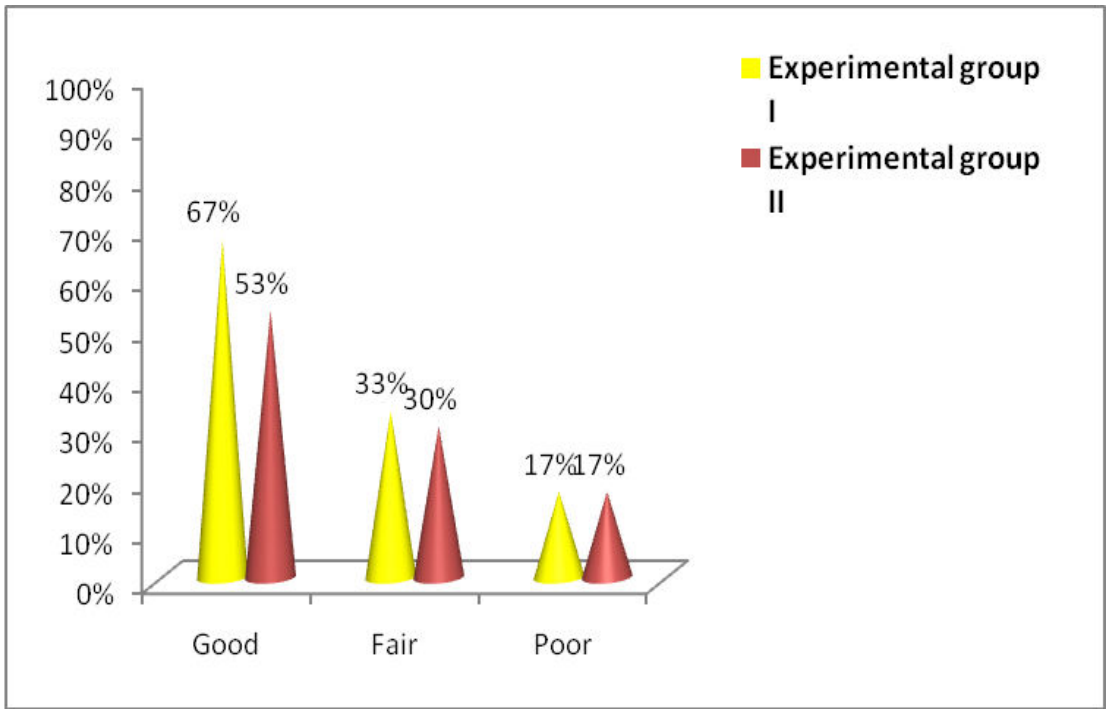


Figure 4.4: Cone diagram showing the distribution of experimental group I and experimental group II sample according to their extracurricular activities.

Distribution of experimental group I and experimental group II according to their extracurricular activities depicts that highest percentage (67% and 53%) of schooler had good extracurricular activities in experimental group I and experimental group II. However more or less similar percentage (33% and 30%) of schooler had fair extracurricular activities in experimental group I and experimental group II .It shows that most of the schooler had good extracurricular activities in the curriculum. **(Fig: 4.4)**

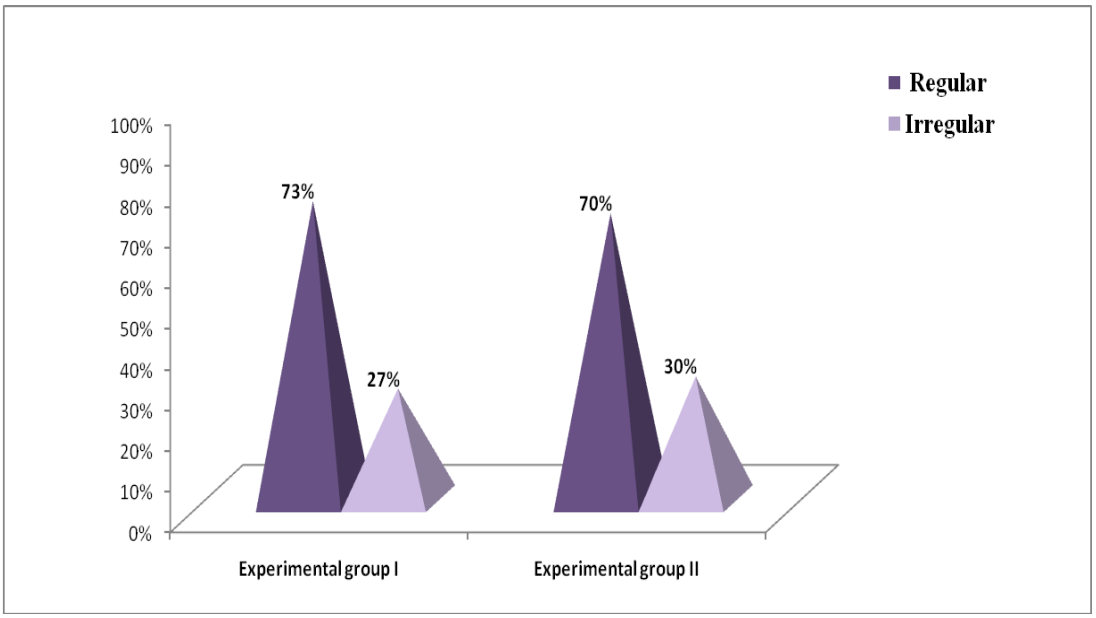


Figure 4.5: Pyramid diagram showing the distribution of experimental group I and experimental group II sample according their attendance

Distribution of experimental group I and experimental group II according to their attendance depicts that higher percentage (73% and 70%) of schoolers had regular attendance in experimental group I and experimental group II . However similar (23% and 30%) of schooler had irregular attendance in both experimental group I and II respectively. It shows that most of the schooler was regular in the school. **(Fig: 4.5)**

SECTION-B: ASSESS THE LEVEL OF DYSCALCULIA AMONG EXPERIMENTAL GROUP I AND EXPERIMENTAL GROUP II OF SCHOOLER BEFORE AND AFTER PEER ASITED LEARNING STARTEGIES AND NUMERACY INTERVENTION PROGRAMME

Table: 4.2 Frequency and percentage distribution of the experimental group I pre and posttest scores of dyscalculia among schooler.

($N_1 = 30$)

Level of Dyscalculia	Pre test scores		Post test scores	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Severe	5	17%	2	6%
Moderate	15	50%	5	17%
Mild	10	33%	20	67%
No dyscalculia	0	0%	3	10%

Frequency and percentage distribution of experimental group I pre test and post test Score of level of dyscalculia among schooler depicts that in pre test most (50)% of them had moderate dyscalculia and 17 % of schooler had severe dyscalculia. In post test 67% schooler had mild dyscalculia and only 17% of schooler had moderate dyscalculia whereas 10% of schooler had no dyscalculia. It shows that the Peer Assisted Learning Stategies was effective among schooler. **(Fig. 4.6)**

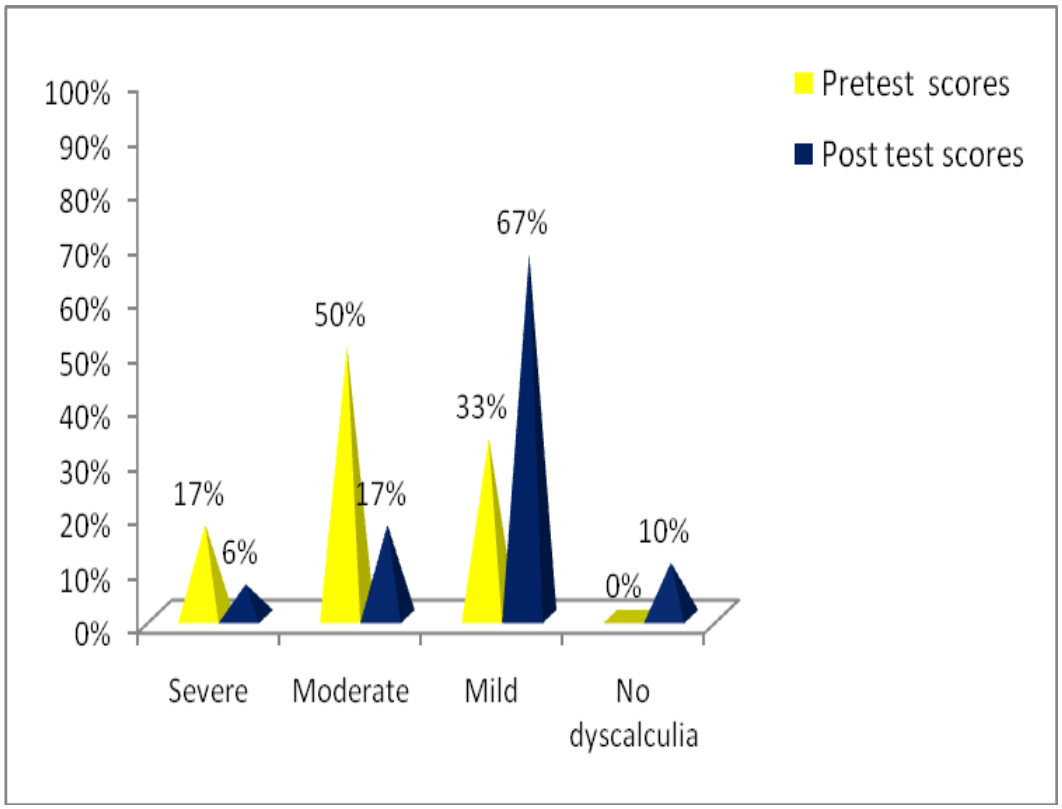


Figure 4.6: Pyramid diagram showing the frequency and percentage distribution of the experimental group I pre and posttest scores of dyscalculia among schooler

Table: 4.3 Frequency and percentage distribution of the experimental group II pre and posttest scores of dyscalculia among schooler.

(N_1 = 30)

Level of dyscalculia	Pre test scores		Post test scores	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Severe	4	13%	1	3%
Moderate	15	50%	7	23%
Mild	11	37%	11	37%
No Dyscalculia	0	0%	11	37%

Frequency and percentage distribution of experimental group II pre test and post test Score of level of dyscalculia among schooler depicts that in pre test most (50%) of them had moderate dyscalculia and 13% of schooler had severe dyscalculia and 37% of schooler had mild dyscalculia. In post test 37% schooler had mild dyscalculia and only 23% of schooler had moderate dyscalculia whereas 37% of schooler had no dyscalculia. It shows that the numeracy intervention programme was effective among schooler. (**Table: 4.3**)

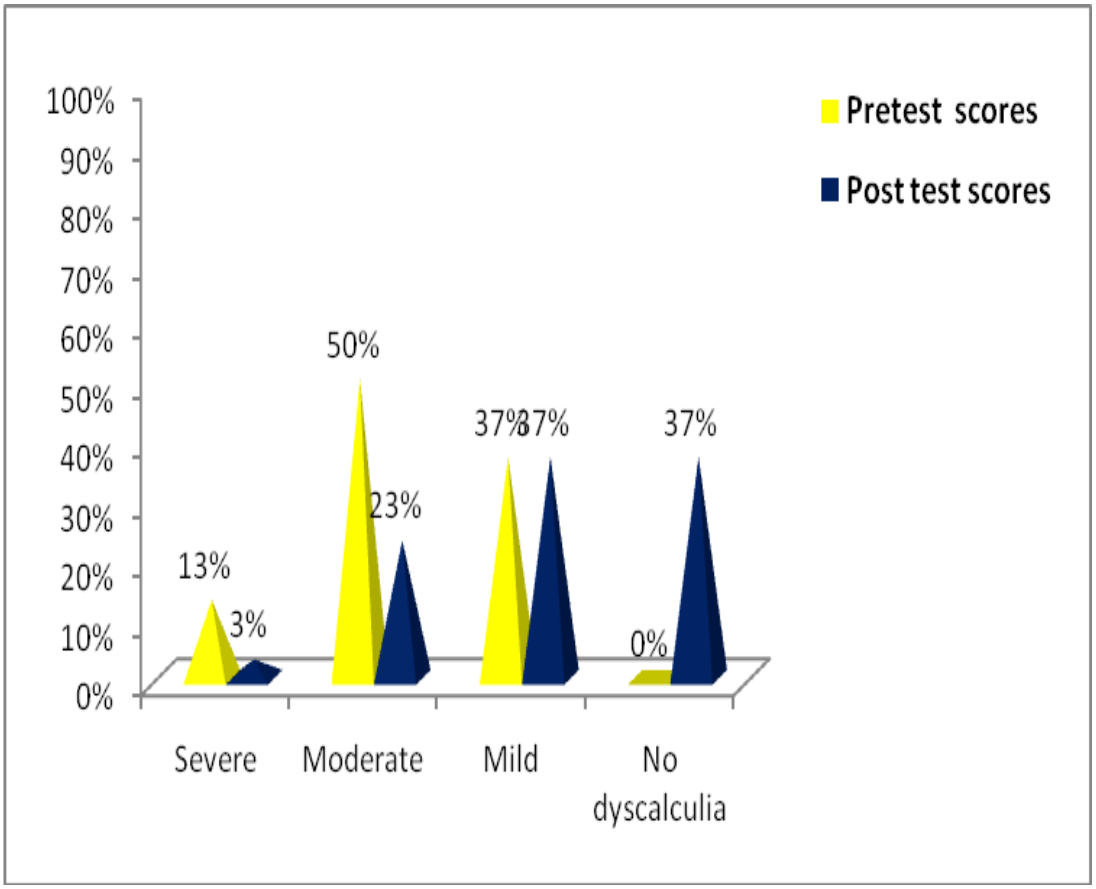


Figure 4.7: Pyramid diagram showing the frequency and percentage distribution of the experimental group II pre and posttest scores of dyscalculia among schooler

SECTION C: DETERMINE THE EFFECTIVENESS OF NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN EXPERIMENTAL GROUP I AND EXPERIMENTAL GROUP II.

Table: 4.4, Comparison of mean, standard deviation and mean percentage of experimental group I and experimental group II pre test and post test scores

($N_1 = 30, N_2 = 30$)

Schooler with dyscalculia	Level of dyscalculia						Difference in mean %
	Pre test			Post test			
	Mean	SD	Mean %	Mean	SD	Mean %	
Experimental Group I	6.8	2.8	68%	11.75	3.5	73%	15%
Experimental group II	7.35	2.25	56%	11.25	3.04	62%	6%

Comparison of pre and post test mean, standard deviation and mean percentage of experimental group I scores depicts that, the overall mean percentage of pretest was 27.2 % and in post test it was 47 %, showing a difference of 19.8% whereas in experimental group II, pretest scores was 29.4 % and post test scores was 40 %, revealing a difference of 10.6 %. It depicts that Peer Assisted Learning Strategies was effective among schooler with dyscalculia in than experimental group II.

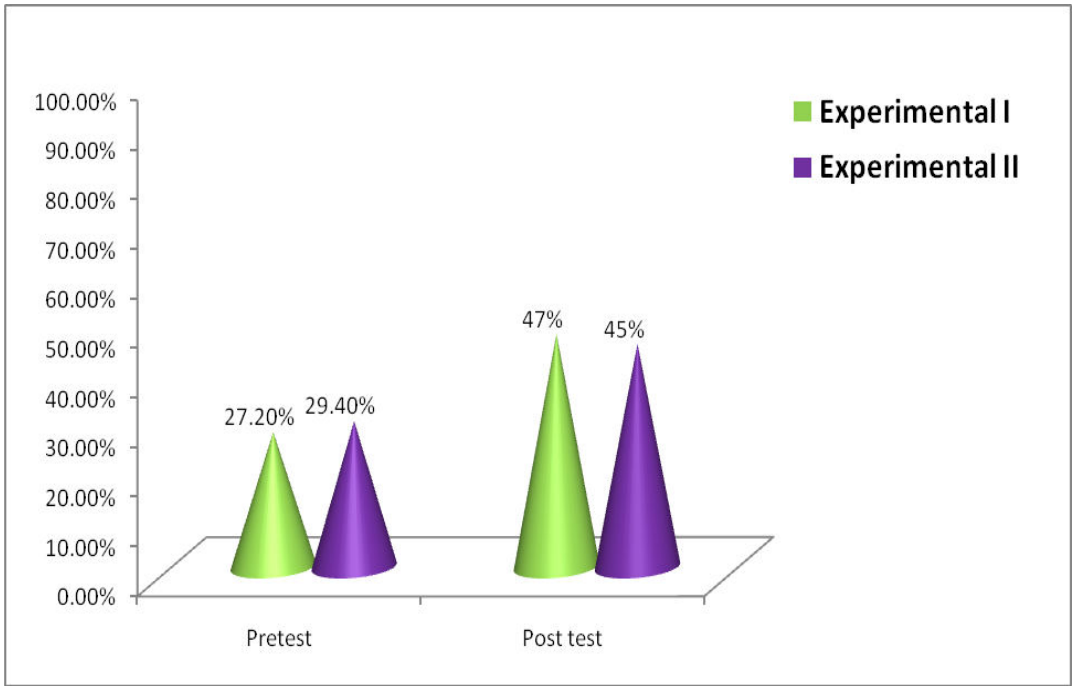


Figure 4.8: Cone diagram showing the distribution of experimental group I and experimental group II sample according their percentage of mean difference

Table: 4.5. Paired 't' test value of experimental group I and experimental group II.

(N=60)

Groups	Paired 't' value	Table value	Level of significance
Experimental group I	12.3	2.09	P<0.05 significant
Experimental group II	7.02	2.09	P<0.05 significant

Df-19, table value 2.09 (p<0.05 significance)

Paired t test was calculated to analysis the difference in experimental group I pre and post test on dyscalculia . The paired 't' value was 12.3, when it compared to table value (2.09) is high. It can be concluded that Peer Assisted Learning Strategies was effective among schooler in experimental group I.

Paired t test was calculated to analysis the difference in experimental group II pre and post test on dyscalculia . The paired 't' value was 7.02, when it compared to table value (2.09) is high. It can be concluded that numeracy intervention programme was effective among schooler in experimental group II.

Table – 4.6: Unpaired 't' test value post test scores of experimental group I and experimental group II.

(N=60)

Schooler	Unpaired 't' value	Table value	Level of significant
Dyscalculia	0.197	2.03	P>0.05 Not significant

Df-38, table value 2.03 (p>0.05 Not significant)

Unpaired test was calculated to analysis the effectiveness between experimental group I and experimental group II post test scores. The Unpaired 't' test value was 0.197, when it compared to table value (2.03) is less. It reveals that there was no significant difference in effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme in experimental group I and experimental group II. It seems that, the both interventions were effective on dyscalculia among schoolers.

SECTION D: FIND OUT THE ASSOCIATION BETWEEN POSTTEST SCORES OF DYSCALCULIA AMONG EXPERIMENTAL GROUP I AND EXPERIMENTAL GROUP II OF SCHOOLER WITH THEIR DEMOGRAPHIC VARIABLES.

Chi-square was calculated to analyze the association between demographic variables with the experimental group I and II post test scores on dyscalculia among schooler.

Table: 4.7: Chi-square value of association between experimental groups-I post test scores with their demographic variables.

(N1=30)

Demographic Variables	Df	Chi-square	Table value	Level of significance
Age	2	1.04	5.99	p>0.05 not significant
Sex	1	0.98	3.84	p>0.05 not significant
Birth order of the child	2	1.49	5.99	p>0.05 not significant
Extracurricular activities	2	3.2	5.99	p>0.05 not significant
Attendance	1	3.2	3.84	p>0.05 not significant

Df-1, Not significant at P>0.05

Chi-square was calculated to find out the association between the experimental group I scores of the schooler with their demographic regarding numeracy intervention programme on dyscalculia. experimental group I when compare to age, gender, birth order of child, extracurricular activities and attendance,($p>0.05$). It is not significant. Hence, it can be interpreted that there is no significant association between demographic variables and experimental group I post test scores of schooler with dyscalculia ,it is lesser than table value.

Table: 4.8: Chi-square value of association between experimental groups-II post test scores with their demographic variables.

(N_1=30)

Demographic Variables	Df	Chi-Square	Table value	Level of significance
Age	2	1.2	5.99	p>0.05 not significant
Sex	1	2.1	3.84	p>0.05 not significant
Birth order of the child	2	2.1	5.99	p>0.05 not significant
Extracurricular activities	2	2.9	5.99	p>0.05 not significant
Attendance	1	0.82	3.84	p>0.05 not significant

DF-1, Not significant at p>0.05

Chi-square was calculated to find out the association between the experimental group II scores of the schooler with their demographic regarding numeracy intervention programme on dyscalculia, experimental group II when compare to age, gender, birth order of child, extracurricular activities and attendance,(p>0.05). It is not significant. Hence, it can be interpreted that there is no significant association between demographic variables and experimental group II post test scores of schooler with dyscalculia, it is lesser than table value.

CHAPTER – V

DISCUSSION

This chapter deals with the discussion which was based on the findings obtained from the statistical analysis and its relation to the objectives of the study, the conceptual frame work and the related literature.

This study was used to assess the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler at selected school at Madurai district.

The following were the objectives of this study.

1. To assess the level of dyscalculia among schooler before and after Peer Assisted Learning Strategies and numeracy intervention programme in experimental group I and experimental group II.
2. To assess the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.
3. To assess the difference in effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.
4. To find out the association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II.

Objectives 1: To assess the level of dyscalculia among schooler before and after numeracy intervention programme in experimental group I and experimental group II.

This was analyzed by using frequency and percentage and the result shows that,

Experimental group I

- In pretest, the majority (50)% of them had moderate dyscalculia and 17 % of schooler had severe dyscalculia.

- In post test 67% schooler had mild dyscalculia and only 17% of schooler had moderate dyscalculia whereas 10% of schooler had no dyscalculia.

Experimental group II

- In pretest most (50%) of them had moderate dyscalculia and 13% of schooler had severe dyscalculia and only 37% of schooler had smild dyscalculia.

- In post test 37% schooler had mild dyscalculia and moderate dyscalculia, only 23% of schooler had moderate dyscalculia whereas 37% of schooler had no dyscalculia.

Hypothesis 1: There is a significant level of pre test and post test scores on dyscalculia among schooler in experimental group I and experimental group II before and after numeracy intervention programme . So this hypothesis was accepted.

Objectives 2: To assess the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

This was analyzed by using mean, standard deviation, mean percentage, paired 't' test and the result shows that,

Experimental group I

- In pretest the mean score was 6.8 ±2.8 and mean percentage was 27.2%.
- In post test the mean score was 11.75 ± 3.5 and mean percentage was 47%.
- Mean difference in percentage was 19.8 %
- The Paired 't' test value of experimental group I was 12.33 when compared to table value 2.09 it is high.

Experimental group II

- In pretest the mean score was 7.35 ± 2.25 and mean percentage was 29.4%.
- In post test the mean score was 11.25 ± 3.04 and mean percentage was 40%.
- Mean difference in percentage was 10.6 %.
- The Paired 't' test value of experimental group I was 7.02 when compared to table value 2.09 it is high.

Hypothesis 2: There is effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II. So the hypothesis was accepted.

Objectives 3: To assess the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

This was analyzed by using unpaired‘t’ test and the result shows that,

Experimental group I and experimental group II

- The Unpaired ‘t’ test value for post test scores of experimental group I and experimental group II was 0.197 when compared to table value 2.03 is less.

Hypothesis 3: There is significant difference in the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II. So the hypothesis was rejected.

Objective 4: To find out the association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II. This was analyzed by using chi-square test and the result shows that,

Experimental group I

- ❖ Chi square value for age of the schooler was 1.04 ($p<0.05$)
- ❖ Chi square value for sex of the schooler was 0.98 ($p>0.05$)
- ❖ Chi square value for birth order of the schooler was 1.49 ($p>0.05$)

- Chi square value for extracurricular activities of the schooler was 3.2 (p>0.05)

- Chi square value for attendance of the schooler was 3.2 (p>0.05)

It reveals that there was no significant association found between the post test scores of Experimental group I when compared to age, sex, birth order, extracurricular activities and attendance (p>0.05).

Experimental group II

- Chi square value for age of the schooler was 1.2 (p>0.05)

- Chi square value for sex of the schooler was 2.1 (p>0.05)

- Chi square value for birth order of the schooler was 2.1 (p>0.05)

- Chi square value for extracurricular activities of the schooler was 2.9 (p>0.05)

- Chi square value for attendance of the schooler was 0.82 (p>0.05)

- It reveals that there was no significant association found between the post test scores of Experimental group II when compared to age, sex, birth order, extracurricular activities and attendance (p>0.05).

Hypothesis 4: There is a significant association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II, so the hypothesis was rejected.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This chapter deals with the summary of the study, its findings, conclusion and the implications for nursing administration, nursing practice, nursing education and nursing research. This study has been started with a few limitations and ends with suggestions and recommendations for research in future.

SUMMARY

Dyscalculia is a learning disability that affects the ability to acquire arithmetical skills and it affect nearly 4 – 7% of the world population. Peer Assisted learning strategies and Numeracy intervention is a creative and a high-quality mathematics education, providing the solution to mathematical problems. So the investigator studied the "effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in selected school at Madurai district.

The objectives of the study were,

- To assess the level of dyscalculia among schooler before and after Peer Assisted Learning Strategies and numeracy intervention programme in experimental group I and experimental group II.

- To assess the effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

- To assess the difference in effectiveness of Peer Assisted Learning Strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

- To find out the association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II.

The hypothesis of the study were,

Researchers formulated and tested the following research hypothesis,

H_1 : There is a significant level of dyscalculia among schooler before and after peer assisted learning strategies and numeracy intervention programme in experimental group I and experimental group II

H_2 : There is significant effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

H_3 : There is significant difference in the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

H_4 : There is a significant association between post test scores of dyscalculia among schooler and their selected demographic variables in experimental group I and experimental group II.

The review of literature on related studies helped the investigator to design the methodology, conceptual frame work and find out the tool. The literature reviews for the present study were presented under the following headings. (1Studies related to Learning disabilities

- Studies related to Dyscalculia
- Studies related to Peer Assisted Learning Strategies
- Studies related to Numeracy Intervention Programme
- Studies related to Peer Assisted Learning Strategies on dyscalculia
- Studies related to Numeracy Intervention Programme on dyscalculia.

The conceptual framework set up for the present study was the **Orlando's deliberate nursing process model**. The research design adopted for the study was factorial research design. Setting chosen to conduct the study was at selected school, Nammakal district".

In this study the samples were schooler with dyscalculia. The sample size was 40 (experimental group 20 and control group 20). In this simple random sampling technique was used. Structured questionnaire was used to assess the level of dyscalculia.

The content validity was obtained from experts like Pediatrician, statistician school teacher and nurse specialist and the tool was modified according to the suggestions and recommendations of the experts. The reliability was tested by implementing the tool on schooler with dyscalculia at Government primary school, Madurai district in other than sample area. Test retest method was used to test the reliability of the tool and the tool was found to be reliable. ($\mathbf{r^1} = 0.95$).

The main study was conducted in Panchayat Union Primary school at Uvari, Madurai district. The samples were selected by using simple random sampling method among those who fulfill the sampling criteria. Peer assisted Learning strategies and Numeracy intervention programme were given to experimental group I and experimental group II. Data was gathered through structured questionnaire for dyscalculia. The data gathered were analyzed by descriptive and inferential statistical method and interpretation was made based on the objectives of the study.

FINDINGS

The major findings of the study were presented under the following headings.

I. Findings related to description of sample characteristics of experimental group I and II according to their demographic variables.

In experimental group I,

- Equally (50%) of the schooler were in the age group of 6-7 years and 8 -9 years.

- Majority (57%) of the schooler with dyscalculia were males.

- Half (50%) of the schooler were the first child.
- Most (50%) of the schooler were good in extracurricular activities.
- Majority (73%) of the schooler had regular attendance.

In experimental group II,

- Half (53%) of the schooler were in the age group of 8-9 years.
- Half (50%) of the schooler with dyscalculia were males
- Most (50%) of the schooler were the second child.
- Most (53%) of the schooler had good in extracurricular activities.
- Majority (70%) of the schooler had regular attendance.

II. Findings related to the level of dyscalculia among experimental group I and experimental group II of schooler before and after numeracy intervention programme.

- **In experimental group I,**
  - In pretest majority (50%) of the schooler had moderate dyscalculia.
  - In post test half (10%) of the schooler had no dyscalculia.
- **In experimental group II,**
  - In pretest half (37%) of the schooler had mild dyscalculia.
  - In post test most (37%) of the schooler had no dyscalculia.

III. Findings related to determine the effectiveness of numeracy intervention programme on dyscalculia among schooler in experimental group I and experimental group II.

The effectiveness of numeracy intervention programme was tested by using mean, standard deviation, mean percentage, paired 't' test and unpaired 't' test. The findings shows that,

- **In experimental group I**

  - Paired 't' test value was 12.33
  - In pretest the mean score was 6.8 ±2.8 and mean percentage was 27.2%.
  - In post test the mean score was 11.75 ± 3.5 and mean percentage was 47 %.
  - Mean difference in percentage was 19.8 %

- **In experimental group II**

  - Paired 't' test value was 7.02
  - In pretest the mean score was 7.35 ± 2.25 and mean percentage was 29.4%.
  - In post test the mean score was 11.25 ± 3.04 and mean percentage was 40 %.
  - Mean difference in percentage was 10.6 %.

IV. Findings of difference in effectiveness between experimental I and experimental II

- The unpaired 't' test value was 0.197 (P>0.05, Not significant).

V. Findings the association between posttest scores of dyscalculia among experimental group I and experimental group II of schooler with their demographic variables.

Chi-square was calculated to analyze the association between posttest scores of dyscalculia among experimental group I and experimental group II of schooler with their demographic variables. The results shows that, there were no significant association between the post test scores of dyscalculia in experimental I and II and their selected demographic variable.

IMPLICATIONS FOR NURSING

The findings of the study have implication in Nursing services, Nursing administration and Nursing research.

Nursing services

- This intervention programme help the nursing professionals to teach the children who are admitting in the hospital for some behavior disorder related to learning disability.

- This intervention can be used by the nursing personnels working in the learning disability centers.

- This intervention programme can be conducted by the nursing personnels in the community area to improve mathematical skills among schooler.

Nursing Education

- The nurse educator should educate the nursing professional specially who are working in the community set up about the effectiveness of peer assisted learning strategies and numeracy intervention programme on dyscalculia among schooler.

- The nurse educator should influence the nurse professionals to involve in such programme and train the school children and transmit such information to school teacher to promote this programme.

- The researcher should teach the peer assisted learning strategies and numeracy intervention programme to dyscalculic schooler in regular practice of maths to improve their mathematical skills.

- The nurse educator can identify the dyscalculia in child who admitted with the complaints of any behavioral problem and teach the parents or care giver about the peer assisted learning strategies and numeracy intervention programme.

Nursing Administration

- Nurse administrator can review the policies with peer assisted learning strategies and numeracy intervention programme as a protocol for improving the dyscalculia among schooler.

- Nurse administrator can encourage the researcher to conduct the research to identify the effectiveness of peer assisted learning strategies and numeracy intervention programme

Nursing Research

- The study may be issued for further reference.

- The study may be used to compare the peer assisted learning strategies and numeracy intervention programme with other intervention to identify the effectiveness.

RECOMMENDATIONS

Based on the findings of the study the following recommendation have been made for further study,

- A longer period of intervention can be studied for more reliability and effectiveness.

- A similar study can conducted with larger population.

- A descriptive study may be conducted to assess the knowledge and practice of primary schooler children on selected developmental disabilities.

- A study can be done on incidence of dyscalculia among schooler and issuing the evidence of peer assisted learning strategies and numeracy intervention programme among schooler.

- This study can recommend to government to include numeracy intervention programme for their school programme.

- This similar study can be conducted to compare the peer assisted learning strategies and numeracy intervention programme with other intervention programme like mathematics quiz.

- This similar study can be conducted to compare the peer assisted learning strategies and numeracy intervention programme in males and females.

CONCLUSION

From the findings of the study it can be concluded that,

- Highest percentages with schooler were in the age group of 6-7yrs, most of them were males, second child with good extracurricular activities and regular attendance in the class for the groups.

- Peer Assisted Learning a strategies and Numeracy intervention programme were highly effective on dyscalculia

- There were no significant difference in effectiveness of Peer Assisted Learning a strategies and Numeracy intervention programme on dyscalculia

- There is no significant association found between the post test scores of Experimental group I and II when compared to age, sex, birth order, extracurricular activities and attendance ($p>0.05$).

REFERENCES

BOOK REFERENCE

1. Achar's, (2015), **Text book of pediatrics**, 3rd Edition. Orient Longman Publication, New Delhi.

2. Denise, F.Polit., Cheryl Tatano, Beck.(2012). **Nursing Research principles and methods**. 7th edition. Lippincott William and Wilkins publication, Newyork.

3. Dorothy R. Marlow, (2002). **Text book of pediatric nursing**. 6th Edition. Elsevier Publications. Noida.

4. Haber,S., (1997) "**Comprehensive psychiatric nursing**", (5th ed). St.Louis Missouri: Mosby Publishers.

5. K.P. Neeraja, (2008), "**Text book of mental health and psychiatric nursing**", (1st ed), JP brothers publications.

6. Marilyn J. Hockenberry, "**Wong's essential of pediatrics**". 8th Edition. Elsevier Publications. Noida.

7. Nelson, (2010). "**Text book of pediatrics**", 6th Edition, Elsevier Publications, New Delhi.

8. Niraj Ahuja, K.P, (2002) "**A short text book of psychiatry**", (5th ed). New Delhi: Jaypee Brothers Publication.

9. Noreen Careen, F., (2007) "**Psychiatric nursing**", (1st ed). Haryana: Sonat Publishers.

10. OP Ghai, (2003). "**Text book of pediatrics**", 5th Edition. Mehta Publishers, New Delhi.

11. Potter, A. Patricia and Perry G Anne, (1991), "**Basic nursing theory & practice**", 2nd edition. Mosby publications. (p) Ltd, New Delhi.

12. Sundare Rao, (1998), "**An introduction to biostatistics**", 4th edition. Vegas publications (P) Ltd, New Delhi.

13. Suraj Gupte, (2001), "**Text book of pediatrics**", 9th Edition. Jaypee brothers Medical Publishers, New Delhi.

14. Teeri kyle and Susman carman, (2013). "**Text book of pediatric nursing**". 2nd Edition. Lippincott Williams Publications New Delhi.

JOURNAL REFERENCES

1. Annie. E. Casey, (2009). Learning disability- *Journal of Policy Analysis & management*. P_p:24(1):73-91

2. Bryant BR, Bryant DP, Porterfield J, Dennis MS, Falcomata T, Valentine C, Brewer C, Bell K. The effects of a Tier 3 intervention on the mathematics performance of second grade students with severe mathematics difficulties. Journal of Learning Disabilities. 2016 Mar;49(2):176-88.

3. Bryant DP, Bryant BR, Gersten RM, Scammacca NN, Funk C, Winter A, Shih M, Pool C. The effects of tier 2 intervention on the mathematics performance of first-grade students who are at risk for mathematics difficulties. Learning Disability Quarterly. 2008 May;31(2):47-63.

4. Bryant DP, Bryant BR, Roberts G, Vaughn S, Pfannenstiel KH, Porterfield J, Gersten R. Early numeracy intervention program for first-grade students with mathematics difficulties. Exceptional children. 2011 Oct;78(1):7-23.

5. Butterworth B, Varma S, Laurillard D. Dyscalculia: from brain to education. science. 2011 May 27;332(6033):1049-53.

6. Cecy correia, (2013) *Cannabis psychosis.* British Journal of Addiction, Dec : 14(10) 929-935.

7. Doabler CT, Baker SK, Kosty DB, Smolkowski K, Clarke B, Miller SJ, Fien H. Examining the association between explicit mathematics instruction and

student mathematics achievement. The Elementary School Journal. 2015 Mar 1;115(3):303-33.

8. Dr.Ruth Wolever., (2013), "*Schizophrenia and city residence.* British Journal of Psychiatry, Apr: 55(2), 39 -*50.*

9. Fehrija Skwe, Selma muratoric (2010). Developmental dyscalculia. *International Journal of pediatrics.* ID- 789183

10. Fuchs LS, Fuchs D, Hollenbeck KN. Extending responsiveness to intervention to mathematics at first and third grades. Learning Disabilities Research & Practice. 2007 Feb;22(1):13-24.

11. Gersten R, Beckmann S, Clarke B, Foegen A, Marsh L, Star JR, Witzel B. Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. NCEE 2009-4060. What Works Clearinghouse. 2009 Apr.

12. Gersten R, Clarke B, Jordan NC, Newman-Gonchar R, Haymond K, Wilkins C. Universal screening in mathematics for the primary grades: Beginnings of a research base. Exceptional Children. 2012 Jul;78(4):423-45.

13. Gross-Tsur V, Manor O, Shalev RS. Developmental dyscalculia: Prevalence and demographic features. Developmental Medicine & Child Neurology. 1996 Jan;38(1):25-33.

14. Jordan NC, Glutting J, Ramineni C, Watkins MW. Validating a number sense screening tool for use in kindergarten and first grade: Prediction of mathematics proficiency in third grade. School Psychology Review. 2010 Jun 1;39(2).

15. Landerl K, Bevan A, Butterworth B. Developmental dyscalculia and basic numerical capacities: A study of 8–9-year-old students. Cognition. 2004 Sep 1;93(2):99-125.

16. Landerl K, Bevan A, Butterworth B. Developmental dyscalculia and basic numerical capacities: A study of 8–9-year-old students. Cognition. 2004 Sep 1;93(2):99-125.

17. Math SB, Chandrashekar CR, (2007) *Ethnicity and the use of health services.* Journal of psychological medicine, Aug :39(3) 999-1007

18. McCloskey M. Cognitive mechanisms in numerical processing: Evidence from acquired dyscalculia. Cognition. 1992 Jan 1;44(1-2):107-57.

19. Morgan PL, Farkas G, Wu Q. Five-year growth trajectories of kindergarten children with learning difficulties in mathematics. Journal of Learning Disabilities. 2009 Jul;42(4):306-21.

20. Price GR, Holloway I, Räsänen P, Vesterinen M, Ansari D. Impaired parietal magnitude processing in developmental dyscalculia. Current Biology. 2007 Dec 18;17(24):R1042-3.

21. Rangaswamy Thara, Sujit John, (2009), *A Jamaican psychiatrist evaluates diagnosis at a London psychiatric hospital.* British Journal of Psychiatry, Jul : 11(3), 201-203.

22. Rotzer S, Loenneker T, Kucian K, Martin E, Klaver P, Von Aster M. Dysfunctional neural network of spatial working memory contributes to developmental dyscalculia. Neuropsychologia. 2009 Nov 1;47(13):2859-65.

23. Rousselle L, Noël MP. Basic numerical skills in children with mathematics learning disabilities: A comparison of symbolic vs non-symbolic number magnitude processing. Cognition. 2007 Mar 1;102(3):361-95.

24. Rubinsten O, Henik A. Developmental dyscalculia: Heterogeneity might not mean different mechanisms. Trends in cognitive sciences. 2009 Feb 1;13(2):92-9.

25. Scott M. Nelson. (2011).Specific learning disability in children *Indian Journal of pediatrics.* P_p: 28- 30.

26. Sood S, Jitendra AK. An exploratory study of a number sense program to develop kindergarten students' number proficiency. Journal of Learning Disabilities. 2013 Jul;46(4):328-46.

27. Suresh Bada Math, (2010) *Ecological structure and the distribution of schizophrenia and affective psychoses in Nottingham.* British Journal of Psychiatry, No: 77(1), 68-71

28. Von Aster MG, Shalev RS. Number development and developmental dyscalculia. Developmental Medicine & Child Neurology. 2007 Nov;49(11):868-73.

29. Wilson AJ, Revkin SK, Cohen D, Cohen L, Dehaene S. An open trial assessment of" The Number Race", an adaptive computer game for remediation of dyscalculia. Behavioral and brain functions. 2006 Dec; 2 (1):20.

NET REFERENCE

- www.teachernet.com
- www.interaction.om
- www.pedresearch.com
- www.google.com
- www.yahoo.com
- www.pubmed.com
- www.answer.com
- www.medscape.co.in
- www.wikipedia.org
- www.naturalnews.com

ANNEXURE –I

LETTER SEEKING PERMISSION TO CONDUCT STUDY

From

301617552
II year M.Sc Nursing (Child Health Nursing),
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam P.O,Namakkal Dt.

Forwarded through

The Principal
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam P.O), Namakkal Dt.

Respected Sir,

Sub : Permission to conduct study - Regarding

I am M.Sc. (Child Health Nursing) II year student of Sresakthimayeil Institute of Nursing and Research. As a partial fulfillment of Master of Science in Nursing, I am going to conduct a research and submit the dissertation work to the Tamil Nadu Dr. M.G.R. Medical University, Chennai by October 2018.

The statement of the problem chosen for my study is **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT".**

I request you to permit me to conduct the proposed study under your jurisdiction and provide the necessary facilities for the study. Kindly do the needful.

Thanking you in anticipation,

Yours Faithfully,

(301617552)

PRINCIPAL
SRESAKTHIMAYEIL INSTITUTE OF
NURSING AND RESEARCH
KOMARAPALAYAM - 638 183

SRESAKTHIMAYEIL INSTITUTE OF NURSING AND RESEARCH * KOMARAPALAYAM-638183 *

ANNEXURE – II

LETTER GRANTING PERMISSION TO CONDUCT STUDY

From,

301617552
II year M.Sc Nursing (Child Health Nursing),
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam P.O,Namakkal Dt.

Forwarded through,
The Principal
To,

PRINCIPAL
SRESAKTHIMAYEIL INSTITUTE OF
NURSING AND RESEARCH
KOMARAPALAYAM - 638 183.

The Head Master
Panchayat Union Primary School,
Uvari, Madurai District.

Respected Sir,

Sub: M.Sc., (Nursing) student – research – data collection – regarding.

301617552 is a II year M.Sc. Nursing student of Sresakthimyeil Institute of Nursing and Research. As a partial fulfillment of Master of Science in Nursing, I am going to conduct a research and submit the dissertation work to the Tamil Nadu Dr.M.G.R. Medical University, Chennai by October 2018.

The statement of the problem chosen for my study is **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"**.

I request you to permit me to collect the data from your school. I assure you that I will not in any way affect the routine work of your school nor would it harm the study subjects.

Kindly do the needful.
Thanking you,

Yours sincerely,
301617552
Sresakthimayeil Institute of
Nursing and Research.
Kumarapalayam, Namakkal (Dt).

PANCHAYAT UNION PRIMARY SCHOOL
UVARI
KALLIGUDI UNION,
MADURAI (Dt)., 625707

ANNEXURE – III

LETTER REQUESTING FOR OPINION & SUGGESTIONS OF EXPERTS FOR CONTENT AND TOOL VALIDATION

From

301617552
II year M.Sc Nursing (Child Health Nursing),
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam P.O,Namakkal Dt.

Forwarded through

The Principal
Sresakthimayeil Institute of Nursing & Research,
(JKK Nattraja Educational Institutions)
Kumarapalayam P.O), Namakkal Dt.

Respected Sir/Madam,

Subject: Request for Expert Opinion and Suggestion to establish validation of Content and Research Tool

I am a final year M.Sc Nursing student of Sresakthimayeil Institute of Nursing & Research, (JKK Nattraja Educational Institutions), Komarapalayam,have selected the topic on **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"** as a partial fulfillment of M.Sc (N) programme, which has to be submitted to the Tamil Nadu Dr.M.G.R Medical University.

The prepared study tool is enclosed so I humbly request you to go through and give your valuable suggestions, modification and opinions. Kindly do the needful.

Thanking you in anticipation.

PRINCIPAL
SRESAKTHIMAYEIL INSTITUTE OF
NURSING AND RESEARCH
KOMARAPALAYAM - 638 183

SRESAKTHIMAYEIL INSTITUTE OF NURSING AND RESEARCH • KOMARAPALAYAM-638183 •

Yours faithfully

301617552

ANNEXURE – IV

LIST OF EXPERTS

1. **Dr. Mrs. R. JAMUNA RANI, M.Sc. (Nursing), Ph.D,**
   Principal,
   Sresakthimayeil Institute of Nursing and Research,
   (J.K.K.N. Educational Institutions)
   Kumarapalayam.

2. **Prof. Mrs. P. BEULAH, M.Sc., (N), PGDSH,**
   HOD, Child Health Nursing,
   Sresakthimayeil Institute of Nursing and Research,
   Kumarapalayam.

3. **Dr. G.MAHESWARI, M.Sc., (N), Ph.D.,**
   Professor cum HOD – Child Health Nursing,
   Dhanvantri College of Nursing,
   Pallakkapalayam.

4. **Mrs. S.INDIRA, M.Sc., (N),**
   Vice Principal,
   Anbu College of Nursing,
   Komarapalayam

5. **Mr. S.G.SHAJIN GIJO, M.Sc., (N),**
   Associate Professor,
   Dhanvantri College of Nursing,
   Pallakkapalayam.

6. **Prof. DHANAPAL, M.Sc., PGDC,**
   Statistician,
   Sresakthimayeil Institute of Nursing and Research,
   Kumarapalayam.

APPENDIX – V

CONTENT AND TOOL VALIDATION CERTIFICATE

Name	: **Dr.G.MAHESWARI, M.Sc., (N), Ph.D.,**
Designation	: Professor cum HOD – Child Health Nursing,
Name of the college	: Dhanvantri College of Nursing, Pallakkapalayam.

I hereby certify that I have validated the tool of **301617552-** II year M.Sc Nursing student of Child Health Nursing Department who has taken Dissertation on **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"**

DHANVANTRI COLLEGE OF NURSING PALLAKKAPALAYAM 687 303

Signature of the expert

CONTENT AND TOOL VALIDATION CERTIFICATE

Name : **Mrs.S.INDIRA, M.Sc., (N),**

Designation : Vice Principal,

Name of the college : Anbu College of Nursing,
Komarapalayam.

I hereby certify that I have validated the tool of **301617552-** II year M.Sc Nursing student of Child Health Nursing Department who has taken Dissertation on **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"**

Signature of the expert

CONTENT AND TOOL VALIDATION CERTIFICATE

Name : **Mr.Y.SHAJIN GIJO, M.Sc., (N),**

Designation : Associate Professor,

Name of the college : Dhanvantri College of Nursing, Pallakkapalayam.

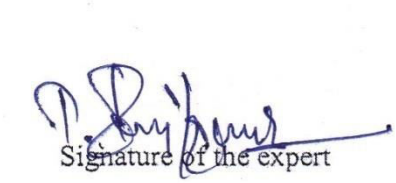
I hereby certify that I have validated the tool of **301617552-** II year M.Sc Nursing student of Child Health Nursing Department who has taken Dissertation on **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"**

Signature of the expert

APPENDIX –VI

CERTIFICATE BY THE ENGLISH EDITOR

This is to certify that the dissertation entitled **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"** is a bonafied research work done by **301617552,** II year M.Sc Nursing, student of Sresakthimayeil Institute of Nursing & Research, (JKK Nattraja Educational Institutions), Kumarapalayam P.O, Namakkal Dt.



Signature of the expert

APPENDIX –VII

CERTIFICATE BY THE STATISTICIAN

This is to certify that the dissertation entitled **"A STUDY TO COMPARE THE EFFECTIVENESS OF PEER ASSISTED LEARNING STRATEGIES VS NUMERACY INTERVENTION PROGRAMME ON DYSCALCULIA AMONG SCHOOLER IN SELECTED SCHOOL, MADURAI DISTRICT"** has been statistically analyzed under the consultation and guidance of the statistician.

Signature of the Statistician
(K. DHANAPAL)

APPENDIX – VIII

DATA COLLECTION TOOL

SECTION-A: DEMOGRAPHIC VARIABLES

1) Age in years

a. 6-7yrs ☐

b. 8-9yrs ☐

2) Sex of the schooler

a. Male ☐

b. Female ☐

3) Birth order of the child

a. First child ☐

b. Second child ☐

c. Third child ☐

4) Extracurricular activities

a. Good ☐

b. Fair ☐

c. Poor ☐

5) Attendance

a. Regular ☐

b. Irregular ☐

SECTION B: STRUCTURED QUESTIONAIRE FOR DYSCALCULIA

1) Which picture shows **5** pumpkins?

a) 

b) 

c) 

Answer: _____

2) Which number is more?

a) 84

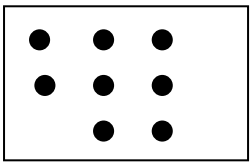
b) 87

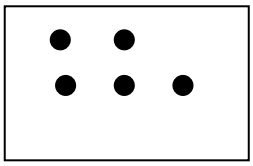
c) 68

d) 67

Answer: _____

3) Which box has more spots?

a) 

b) 

4) How many flowers are there?

Answer: _____

5) Count the number of watches and answer below:

a) 5

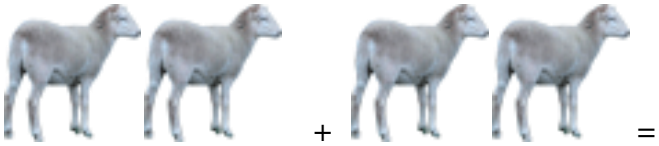
b) 6

c) 7

d) 8

Answer: _____

6) Add:



7) Write the number in ascending order:

20, 10, 15, 5

a) 5, 10, 15, 20

b) 15, 10, 20, 5

c) 10, 20, 5 , 15

8) Answer below questions:

$(45 - 9) + 33 = ?$

a) 70

b) 69

c) 68

d) 72

Answer: _____

9) Number line

a) 50, 51

b) 51, 52

c) 52, 51

10) Counting to fifteen (15) by filling in the missing number below.

1	2		4	5
	7	8	9	10
11	12	13		15

a) 3, 6, 14

b) 4, 7, 14

11) Add:  =

Answer: _____

12) Find the missing number in descending order:

25, 24, ___ , 22, 21

a) 24

b) 23

c) 20

13) Complete the substraction:

54

36

a) 20

b) 18

c) 22

d) 19

Answer: _____

14) Which picture shows 1 + 1 = 2?

a) 

b) 

c) 

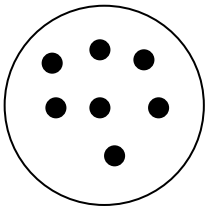
d) 

Answer: _____

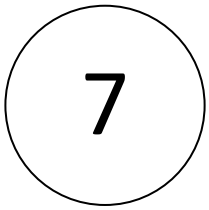
15) Find the answer:

2 tens	+	3 ones	=	

16) How many spots are there, does this match the number?



a) Yes



b) No

17) Raju had a birthday party. 1 girl and 2 boys from his class came. How many of Raju's classmates were at the party?

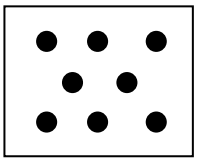
a) 3 ☐

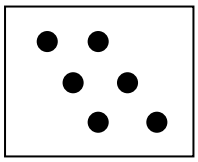
b) 2 ☐

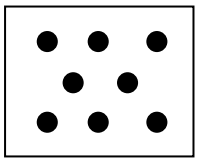
c) 5 ☐

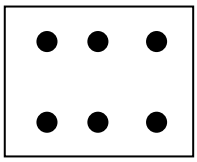
d) 4 ☐

18) Match the dots?



a) 

b) 

c) 

19) Write the multiplication:

2 x 4 = _____

a) 6 ☐

b) 4 ☐

c) 8 ☐

d) 2 ☐

20) Which words make this statement true?

99 ____ 99

a) is greater than (>) ☐

b) is less than (<) ☐

c) is equal to (=) ☐

21) Which words make this statement true? 89 _____ 69

a) is greater than (>) ☐

b) is less than (<) ☐

c) is equal to (=) ☐

22) Which words make this statement true?

18 _____ 78

a) is greater than (>) ☐

b) is less than (<) ☐

c) is equal to (=) ☐

23) Type the missing number in this sequence: 66, 67, ☐ 69

a) 60 ☐

b) 70 ☐

c) 68 ☐

d) 86 ☐

24) Write the addition: 13 + _____ = 15

a) 4 ☐

b) 2 ☐

c) 3 ☐

d) 1 ☐

25) Kumar helped dry the dishes. He dried 1 small glass and 4 large glasses. How many glasses did he dry?

a) 3 ☐

b) 5 ☐

c) 4 ☐

d) 2 ☐

SCORING KEY

Q.No.	Answer	Q.No.	Answer
1.	C	14.	A
2.	B	15.	23
3.	A	16.	A
4.	14	17.	A
5.	B	18.	B
6.	4	19.	C
7.	A	20.	C
8.	B	21.	A
9.	B	22.	B
10.	A	23.	C
11.	4	24.	B
12.	B	25.	B
13.	B		

SCORING PROCEDURE

Based on the percentage of scores the level of Dyscalculia was graded in 4 categories. They are **"Severe", "Moderate" "Mild" and "No dyscalculia"**.

Level of sensorimotor function	**Actual Score**	**Percentage (%)**
Severe	0-5	25%
Moderate	6-10	50%
Mild	11-15	75%
No dyscalculia	above15	100%

APPENDIX – IX

BLUE PRINT OF PEER ASSISTED LEARNING STRATEGIES

Introduction

PALS is a high quality mathematical teaching which develop the mental fluency with whole numbers, counting and place value and ability to use the combination of numerical, graphical, and algebraic mathematical thinking and assisted by peers.

STAGES

This is teaching programme by peers which consists of 5 stages with duration of 30 minutes, 5 times a week for 4 weeks.

Stage 1- Coaching (the nurse researcher teaches the both students)

Stage 2- interaction between peers (first child to second child)

Stage 3- Change roles (second child to first child)

Stage 4- Practice the questionnaires by both 10 minutes after

Stage 5- Grading by researcher

BLUE PRINT OF NUMERACY INTERVENTION PROGRAMME.

Introduction

Numeracy intervention programme is a high quality mathematical teaching which develop the mental fluency with whole numbers, counting and place value and ability to use the combination of numerical, graphical, and algebraic mathematical thinking.

GRADES

It consists of 5 grades, each grade for 5 days with duration of 30 minute per day for 4 weeks. The following grades are:

I grade- Counting

II grade- Finding odd or even

III grade- Addition

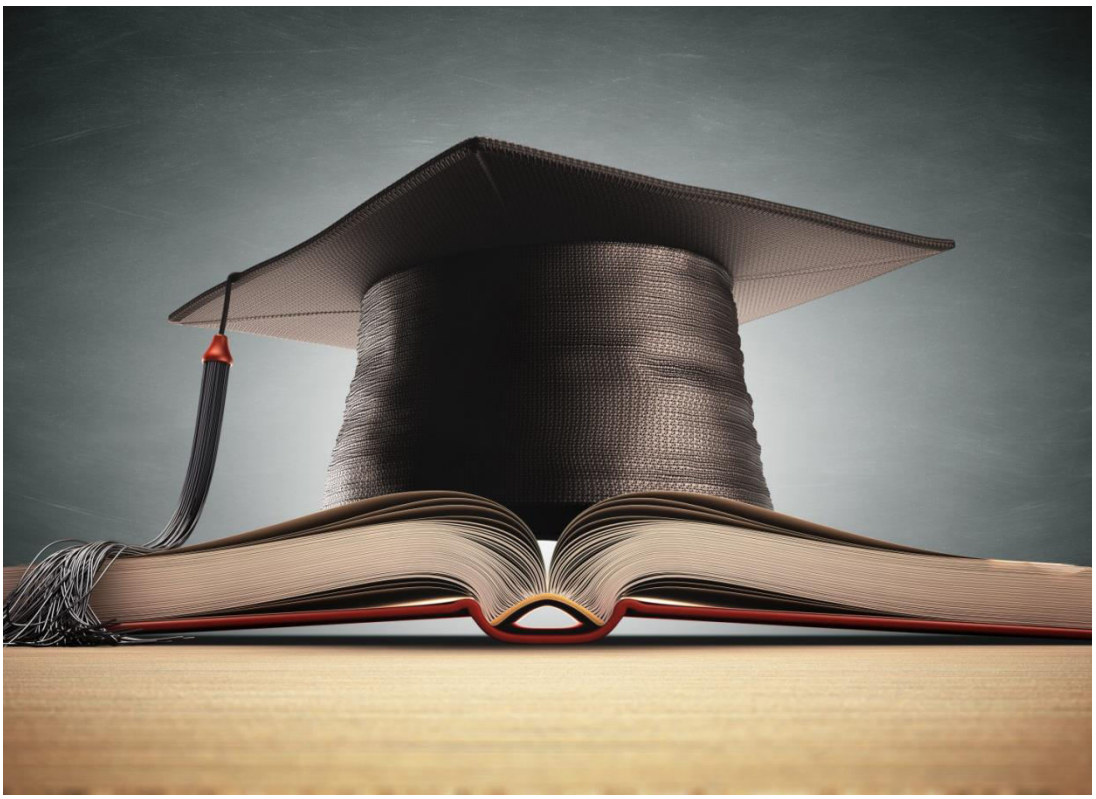
IV grade- Substraction

V grade- Multiplication

APPENDIX – X

PHOTOGRAPHS


3. which side has more ?
the number in the second column
that match numbers in first column



Certificate

Declaration

Acknowledgement

Abstract

List of Contents

List of Tables

List of Figures

List of Appendices

Chapter – I

Introduction

Chapter – II

Review of Literature

Chapter – III

Research Methodology

Chapter – IV

Data Analysis & Interpretation

Chapter – V

Discussion

Chapter – VI

Summary, Conclusion, Implications and Recommendations

References

Appendices

Photographs

Thanking you